King County Brightwater TREATMENT SYSTEM

Brightwater Marine Outfall Human Use Survey of Puget Sound Shorlines

November 2002

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

Brightwater Marine Outfall

Human Use Survey of Puget Sound Shorelines

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King County
Department of
Natural Resources and Parks
Wastewater Treatment
Division

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EXECUTIVE SUMMARY

In November of 1999, The Metropolitan King County Council approved the Regional Wastewater Services Plan to upgrade King County's existing wastewater system. Included in this plan is the construction of a new regional wastewater treatment plant somewhere in northern King or southern Snohomish County. A series of surveys were conducted to identify human recreational use patterns within the project siting area. The information from this survey will be used to identify the potential impact of the treatment plant on human recreational uses on the shoreline within the project area. This document describes the methods and results of the surveys conducted within the siting area, which ranges from Golden Gardens Park in King County to Mukilteo State Park in Snohomish County. Three types of survey forms (i.e., Activity County Survey, Shoreline Use Survey, and Seafood Consumption Survey) were used throughout the 1-year study.

The results of the Activity Count Surveys showed that the numbers of people present varied between sites and was dependent on season and weather conditions. The sites with the most frequent human use were located in the Edmonds area followed by Golden Gardens Park and Mukilteo State Park. Sand/Sediment activities were most frequently observed, followed by water-contact activities, fishing and boating.

The results of the Shoreline Use Survey correspond with the activity count survey. The activities reported with the highest frequency (i.e., walking or sitting on the beach) in the Activity Count Survey made up most of the interviews recorded during the Shoreline Use Survey. Information on the duration and frequency of various activities engaged in by people in the Puget Sound area was characterized. The time spent and frequency of visits throughout the year varied by activity, and in some cases by site.

In addition to identifying recreational patterns, respondents were asked to identify the destinations within the project area that they visited most frequently. The Edmonds area had the most surveys collected, and was reported to be visited most often by people interviewed at other sites. Golden Gardens Park had the second most number of surveys collected and was frequently identified as a place of recreation by people interviewed at other sites

A limited number of anglers were interviewed during the Seafood Consumption Surveys. Golden Gardens Park, the Edmonds area and Mukilteo State Park are equipped with public fishing piers, and thus the majority of the anglers were interviewed at these locations. Respondents reported that fish or crabs were the most sought after seafood types. Anglers typically spent 3-4 hours fishing during a visit and tended to visit these three sites all year and more frequently in the summer. Forty one percent of the respondents intended on consuming their catch and preferred to eat only the flesh portion. Their preferred cooking methods included baking, frying, boiling or grilling. Over half of the anglers consuming their catch shared it with children (< 10 year old). Fish and shellfish consumption rates were estimated based on data collected during the Seafood Consumption Survey. Mean consumption rates for fish or shellfish were 11 grams/day

and 16 grams/day, respectively. The 95th percentile consumption rates were 42 grams/day and 61 grams/day for fish and shellfish, respectively. The consumption rates of the survey population are similar to those calculated for recreational anglers in other Puget Sound surveys.

1.0 INTRODUCTION

In November of 1999, The Metropolitan King County Council approved the Regional Wastewater Services Plan to upgrade King County's existing wastewater system. Included in this plan is the construction of a new regional wastewater treatment plant somewhere in northern King or southern Snohomish County. The new treatment plant will have a marine outfall to discharge treated effluent to Puget Sound. Prior to selecting a site for the marine outfall, it is necessary to investigate the potential impacts of the marine outfall on the surrounding communities. To address this concern, a survey of human shoreline uses was designed to characterize the types of recreational activities occurring within the project area. This document describes the methods and results of the survey conducted within an area ranging from Golden Gardens Park in King County to Mukilteo State Park in Snohomish County. The results of this survey will be considered in the site selection process as well as the environmental impact statement (EIS) for the Brightwater Regional wastewater Treatment System. In addition, the information in this report may be used to derive site-specific exposure estimates for use in detailed human health risk assessments.

2.0 SURVEY METHODS

2.1 Survey Sites

The human use survey design began with a review and selection of survey site locations in the project area (Figure 1). The project area included approximately 20 miles of shoreline from Golden Gardens Park in northern Seattle to Mukilteo State Park in Mukilteo, WA. An examination of the project area was completed by contacting city, county and state parks departments to determine if any data existed on the recreational habits of people using the shorelines. The information collected in the preliminary study is described in the 'Analysis of Human Use of Puget Sound Shorelines' (King County, 2000). Using the information in the latter report, several survey locations were selected (Figure 1). These locations included: Golden Gardens Park (i.e., beach, pier and boat launch), Carkeek Park, Richmond Beach Park, Edmonds parks (including Brackett's Landing, Edmonds fishing pier, and Olympic Beach south of ferry dock), Meadowdale Park, Picnic Point Park, and Mukilteo State Park (i.e., north and south of the ferry terminal). Each of the sites was selected because of their proximity to the proposed outfall sites, frequency of human use and public accessibility. Three additional sites (Sites 3, 9 and 11) were examined for inclusion in the survey, but were later eliminated due to accessibility issues[1]. Upon selection of the final eleven sites, survey techniques were developed and surveyors were hired and trained. Sites were then surveyed for a period of approximately one-year (i.e., March 2001 – March 2002). For data recording purposes, the survey sites were numbered. The Golden Gardens Park, Edmonds and Mukilteo State Park areas were divided into several sites because of their large size. The numbering system used during the survey (Table 1) is also used throughout this report to present data for each site.

2.2 Survey Forms

Three types of survey forms were developed to collect information regarding human recreational use of the shorelines along the project area (Attachment A). These included an 'Activity Count Survey', a 'Water and Shoreline Use Survey', and a 'Seafood Consumption Survey'. A general description of each of these forms is provided below:

- *Activity Count Survey (ACS)*: This form was completed during each visit to the survey location. Information collected on this survey form included weather conditions[2] and the number of people present within the shoreline area. The numbers of people present were identified by recreational activity and by age group[3].

[1] These sites were difficult to reach by the surveyors or the public, or had no public shoreline access.

[2] Weather conditions were based on surveyor observation. Temperature, wind speed or other weather variables were not directly measured.

[3] The recreational activity and age of the people observed on the shoreline were identified based on the surveyor's best professional opinion.

Figure 1. Survey Sites

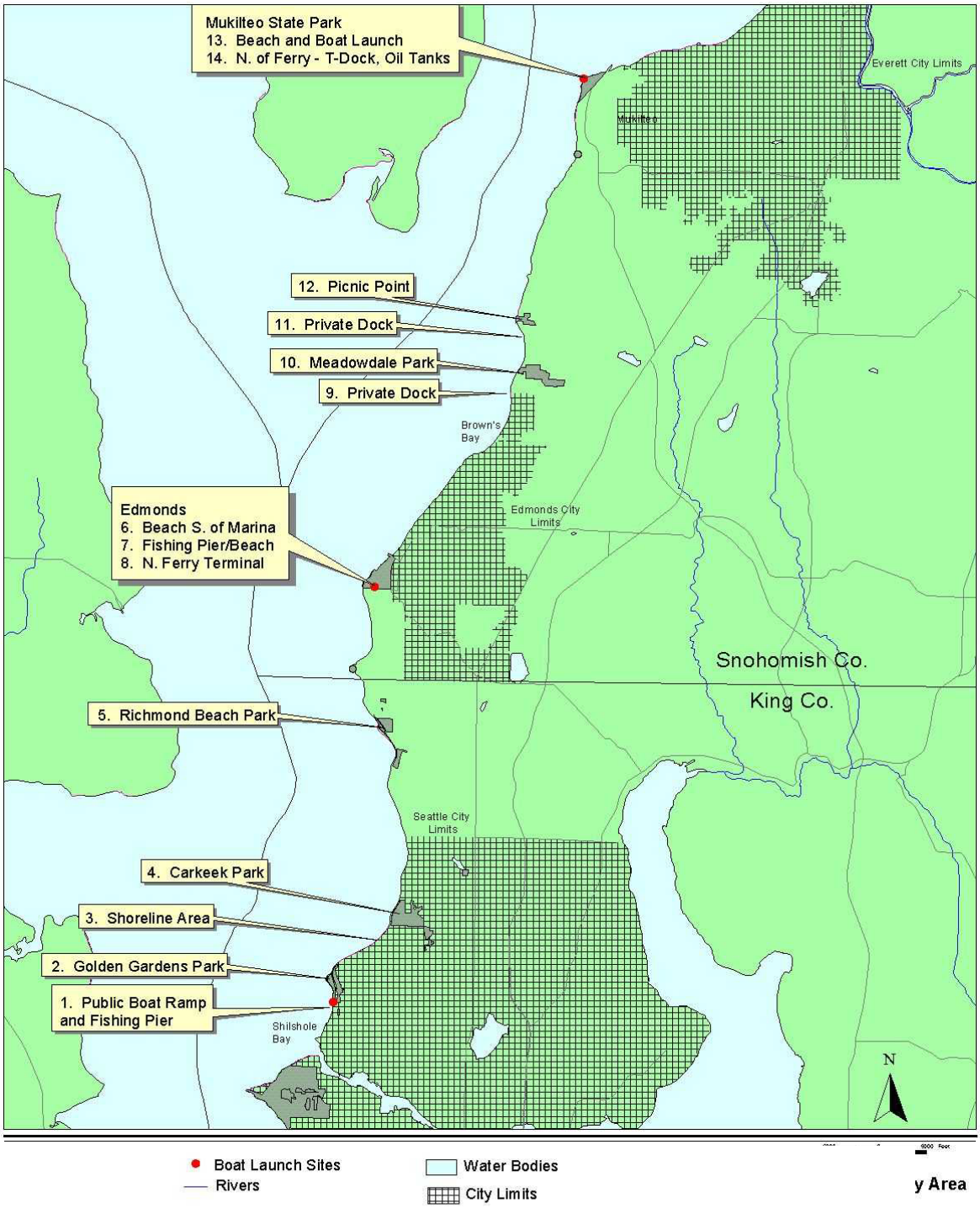


Table 1
Site Description Codes

Site Name	Site Code Number
Golden Gardens (Pier and Boat Launch)	1
Golden Gardens (Beach)	2
Carkeek Park	4
Richmond Beach Park	5
Edmonds South (Olympic Beach)	6
Edmonds Pier (Fishing Pier and South Brackett's Landing)	7
Edmonds North (Brackett's Landing North of Ferry Terminal)	8
Meadowdale Beach Park	10
Picnic Point Park	12
Mukilteo State Park South (South of Ferry Terminal)	13
Mukilteo State Park North (North of Ferry Terminal)	14

- *Water and Shoreline Use Survey (SUS)*: After completion of the ACS, the surveyor proceeded to interview people present at the survey location. This survey form was used to record information about each respondent's age, ethnicity, intended activity, and the frequency and duration of the intended activity.
- *Seafood Consumption Survey (SCS)*: After completion of the ACS, the surveyor proceeded to interview anglers present at the survey location. This survey form was used to record information about each angler's age, ethnicity, intended catch, and the frequency and duration of the seafood collection activity.

In addition, the survey forms were translated into Vietnamese and Filipino, in case the surveyors encountered a language barrier with the respondents. These languages were chosen because of the more frequent use of nearby shoreline areas by these ethnic groups (Simmonds et al. 1998). However, the translated forms were rarely utilized due to minimal encounters with non-English speaking people. A question-by-question analysis of the completed surveys is provided in Section 3.0 of this report.

2.3 Surveyor Identification and Training

A job announcement for a 'Temporary Shoreline Surveyor' was placed with several local colleges and universities. Eight surveyors were recruited and trained throughout the duration of the survey. Training of the surveyors was completed in a 3-4 hour period. During this time the surveyors were introduced to the study area, trained on filling out the survey forms, and provided with techniques to approach potential respondents and avoid introducing bias. Surveyors practiced using the survey forms prior to conducting their first survey in the field. The completed survey forms were also monitored throughout the

study to ensure that the interviewers were collecting data in a consistent and correct manner.

2.4 Survey Schedule

The survey was conducted for a period of approximately one-year (March 2001 to March 2002). Several surveys were completed each month during the hours of 6 a.m. to 8 p.m. (i.e., dawn to dusk) on both week and weekend days. The number of samples collected for each site by month is presented in Table 2. Surveyors visited each site for approximately one-hour, completed the ACS form, and interviewed as many people as possible using the SUS and SCS forms. If no people were present at the site during the visit, the surveyor moved on to the next site. On occasion, a site was visited more than once in a day if there were low numbers of people present. The surveyors wore no identifying clothing, caps or badges to minimize respondent bias. The completed survey forms were coded and entered into an electronic database (Microsoft Excel® '97) to allow for data analysis.

2.5 Data Analysis/Statistics

The results from each of the survey forms are presented in Section 3.0. Descriptive statistics were computed for the each of the questions on the survey forms. The statistics included sample size, mean, standard deviation, minimum values, maximum values and in some cases percentiles. The majority of the parameters analyzed in this assessment are presented on a site-by-site basis or represented by a total of samples from all sites.

Hypothesis testing was completed using SPSS V11.0 for Windows®. Significant differences for several variables were examined by location, age group, gender and ethnicity. Levene's test was used to test for homogeneity of variance among the variables. If the Levene's test was not significant, then the distributions were considered normal and one-way Analysis of Variance (ANOVA) was used to determine whether means differed significantly. If the Levene's test was significant, then the distributions were considered non-normal and a non-parametric test (i.e., Kruskall-Wallis) was conducted to evaluate whether means differed significantly. Significance for all tests was set at $p<0.05$. If the results of the ANOVA were significant, a multiple comparison test (i.e., Tukey's test) was used to determine which locations, age groups, genders or ethnic groups differed. Groups with a sample size of 1 or less were excluded from this analysis. The results of the statistical tests are discussed throughout the document, while the SPSS output is provided in Attachment B.

Table 2
Number of survey site visits by month

	Month/Year														
Location (Code)	**02 / 01**	**03 / 01**	**04 / 01**	**05 / 01**	**06 / 01**	**07 / 01**	**08 / 01**	**09 / 01**	**10 / 01**	**11 / 01**	**12 / 01**	**01 / 02**	**02 / 02**	**03 / 02**	**Total**
Golden Gardens Park															
Pier/Boat Launch (1)	0	1	2	4	5	6	4	3	9	5	4	7	2	1	53
Beach (2)	0	1	2	4	5	4	4	2	4	5	4	7	2	1	45
Carkeek Park (4)	0	1	3	5	5	6	4	4	6	3	3	7	2	1	50
Richmond Beach Park (5)	0	2	3	4	3	4	4	3	4	3	2	4	1	1	38
Edmonds															
South (6)	0	2	3	5	5	10	4	3	4	5	2	3	2	1	49
Pier (7)	0	2	2	7	4	6	4	3	3	3	2	2	2	1	41
North (8)	0	5	2	5	4	6	6	3	3	3	4	2	2	0	45
Meadowdale Park (10)	0	2	2	4	4	8	4	2	4	4	3	5	1	0	43
Picnic Point Park (12)	1	3	2	5	6	8	3	5	3	4	4	3	3	1	51
Mukilteo State Park															
South (13)	0	3	2	4	9	9	4	3	4	4	4	3	4	1	54
North (14)	0	2	2	4	8	7	3	2	4	3	5	2	3	1	46
Total	1	24	25	51	58	74	44	33	48	42	37	45	24	9	515

Note: As described in Section 2.1, sites 3, 9 and 11 were eliminated due to accessibility issues

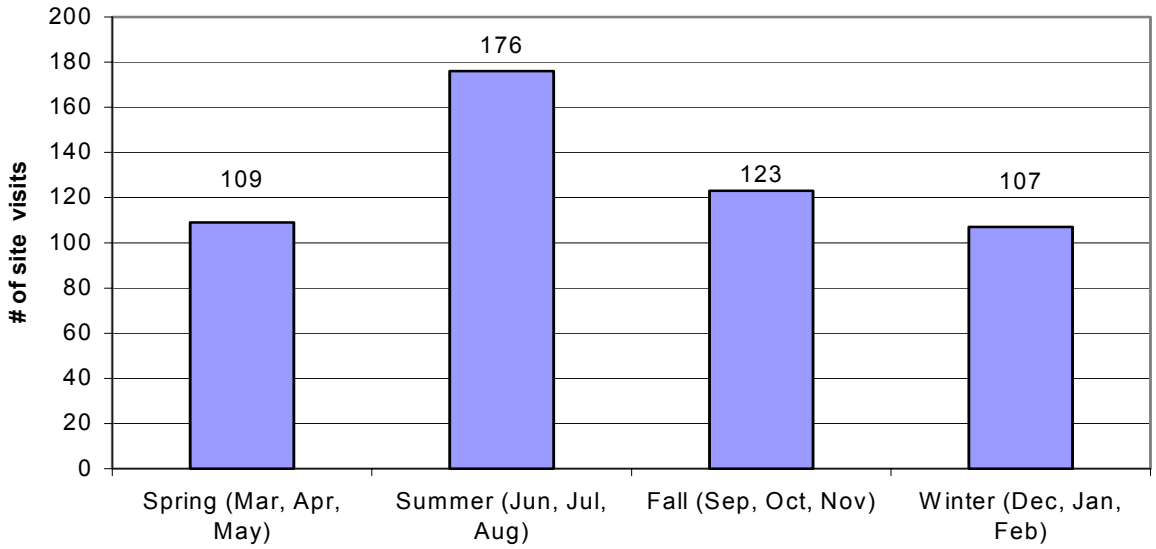
3.0 SURVEY RESULTS

3.1 Activity Count Survey

The activity count survey (ACS) was used to record the weather conditions and the number of people observed during each site visit. The information on the ACS forms was collected immediately upon the surveyors' arrival at the site location. Thus, the data collected herein represents a 'snapshot' in time at the survey location. Accordingly, the information is presented and should be interpreted as a general characterization of the level and type of use at each site based on observed activities and numbers of people present.

The number of site visits and ACS forms completed are presented in Table 2 (Section 2.0). Each site was visited between 38 and 54 times throughout the year. During one survey shift, it was possible for the surveyor to visit a site more than once. Therefore, some sites were visited more often throughout the survey. Each of the eleven sites were visited throughout the entire year, with more visits performed during the summer months (Figure 2), when more people were expected to be present on the shoreline.

Figure 2. Number of Site Visits by Season



A qualitative examination of the number of surveys collected by time of day (Figure 3) and weather condition (Figure 4) was also performed. Data was collected at varying times throughout the day between 6 a.m. and 8 p.m. Each of the sites was visited between 10-27, 10-17, 3-16, and 3-9 times during the hours of 6 a.m.- 10 a.m., 10 a.m.- 2 p.m., 2 p.m.- 5 p.m., 5 p.m.- 8 p.m., respectively. Surveys tended to be collected more often during clear or cloudy days compared to rainy days (Figure 4). Thus, ACS surveys were collected over a variety of times and weather conditions.

Figure 3. Number of Site Visits by Time of Day

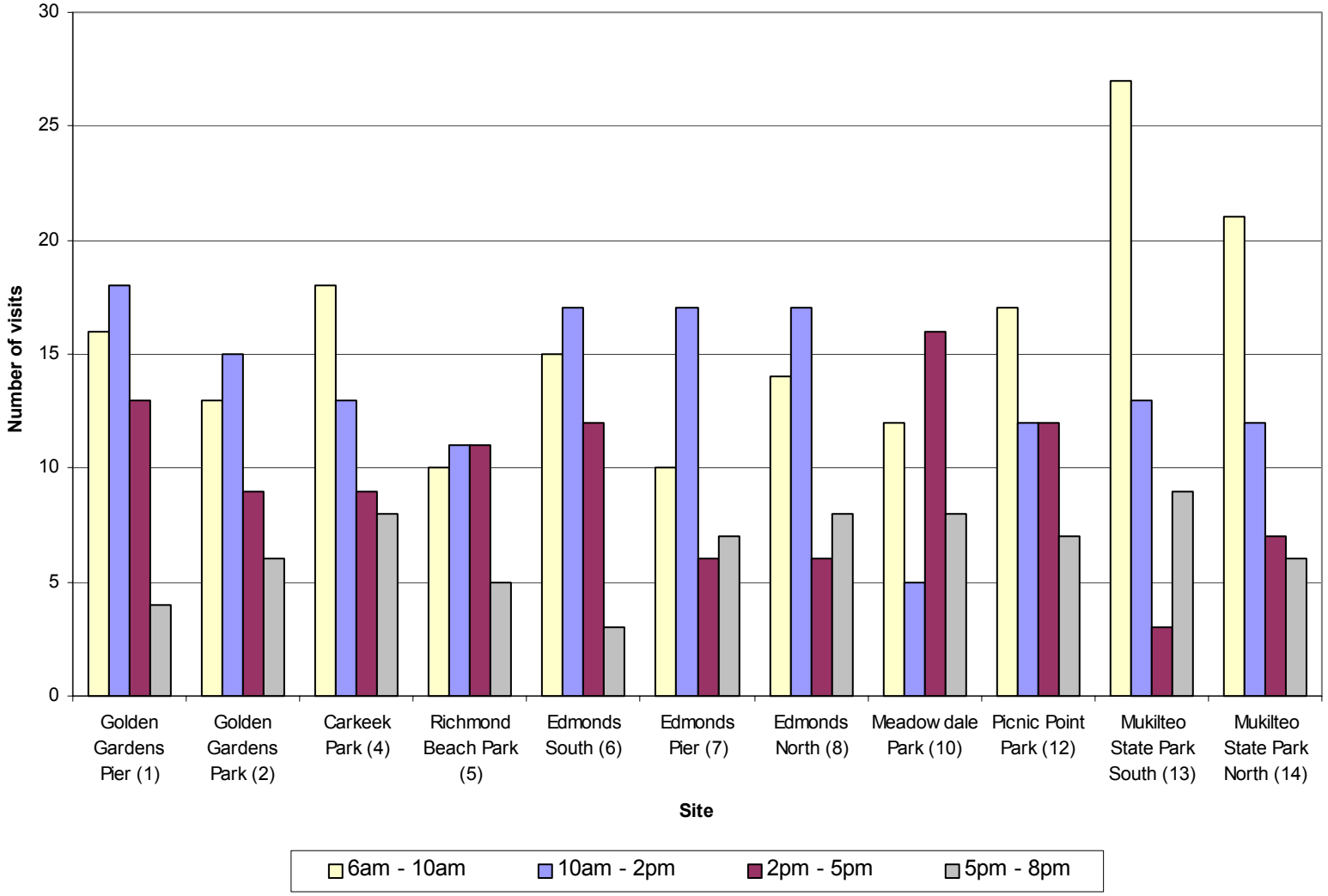
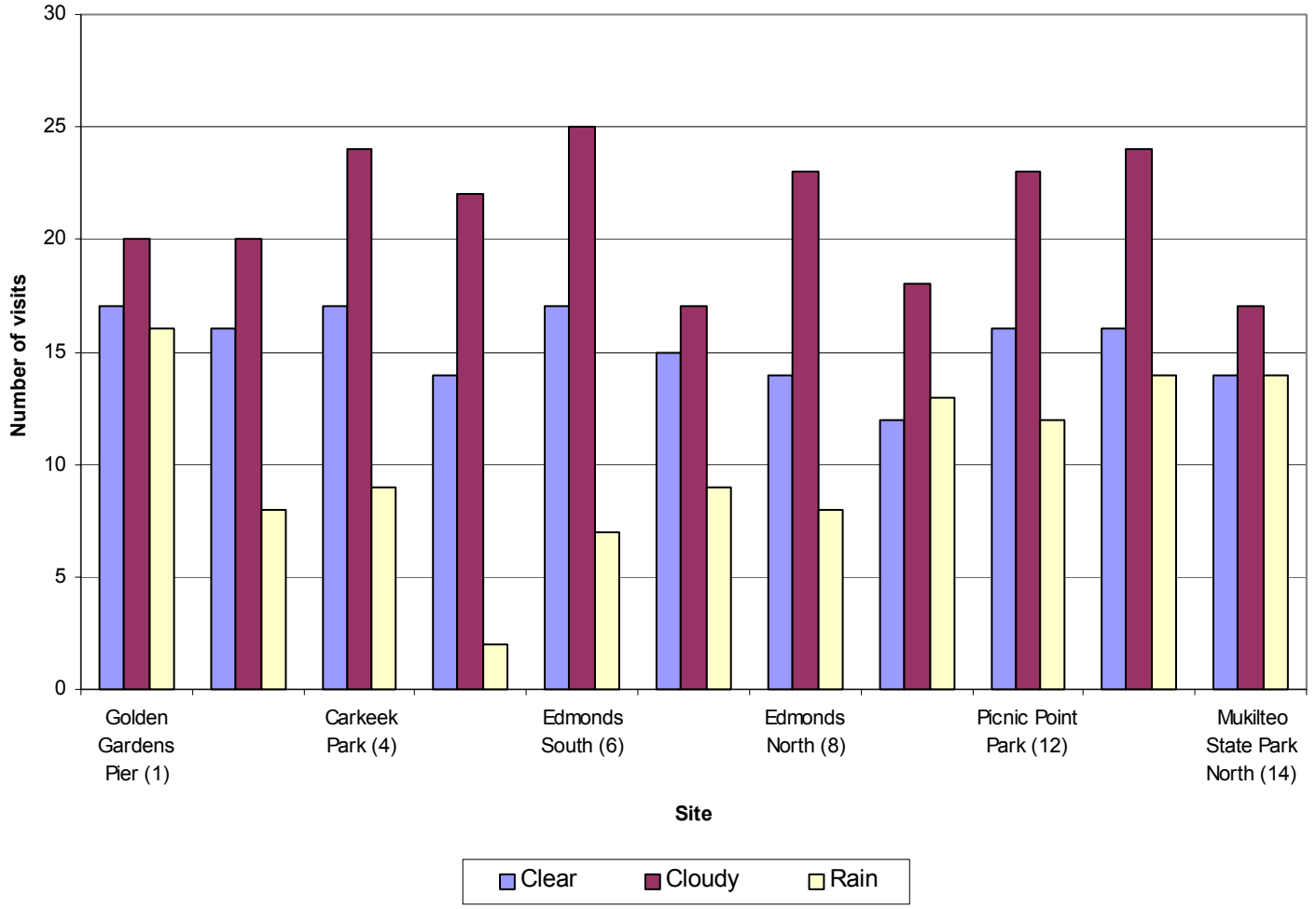


Figure 4. Number of Site Visits by Weather Condition



The number of people present was recorded on the ACS form during each site visit. A summary of the average number of people observed (per visit) at each site throughout the survey is presented in Figure 5 and descriptive statistics are detailed in Table 3. The sites with the highest average number of people present, in order from highest to lowest, are: 2 > 7 > 5 > 6 > 13 > 8 > 4 > 12 > 10 > 1 > 14. However, if the estimates for the larger areas (i.e., Golden Gardens, Edmonds and Mukilteo) are summed, the order would change to the following: (6,7,8) > (1,2) > (13,14) > 5 > 4 > 12 > 10. Statistical comparisons of the average number of people observed we computed and the results are presented in Table 3 (See Attachment B for SPSS output). For each site, the mean number of people observed was compared to all other sites. Those sites that were found to be significantly different ($p<0.05$) are listed in the final column of Table 3.

The presence of people on the shorelines varied depending on season and weather conditions. The highest average number of people per visit was observed in the summer, followed by spring, fall and winter (Figure 6). Clear days were found to have a higher average number of people per visit than cloudy or rainy days (Figure 7). Weather conditions were based solely on surveyor observations; no empirical measurements were made. In addition, some of the weather conditions presented in Figure 7 can be combined; for example a day could be defined as cloudy with light rain and heavy wind. Individual measurements, rather than combinations, were presented to compare how each condition may have affected the number of recreational visitors.

Figure 5. Average Number of People Present Per Visit by Site

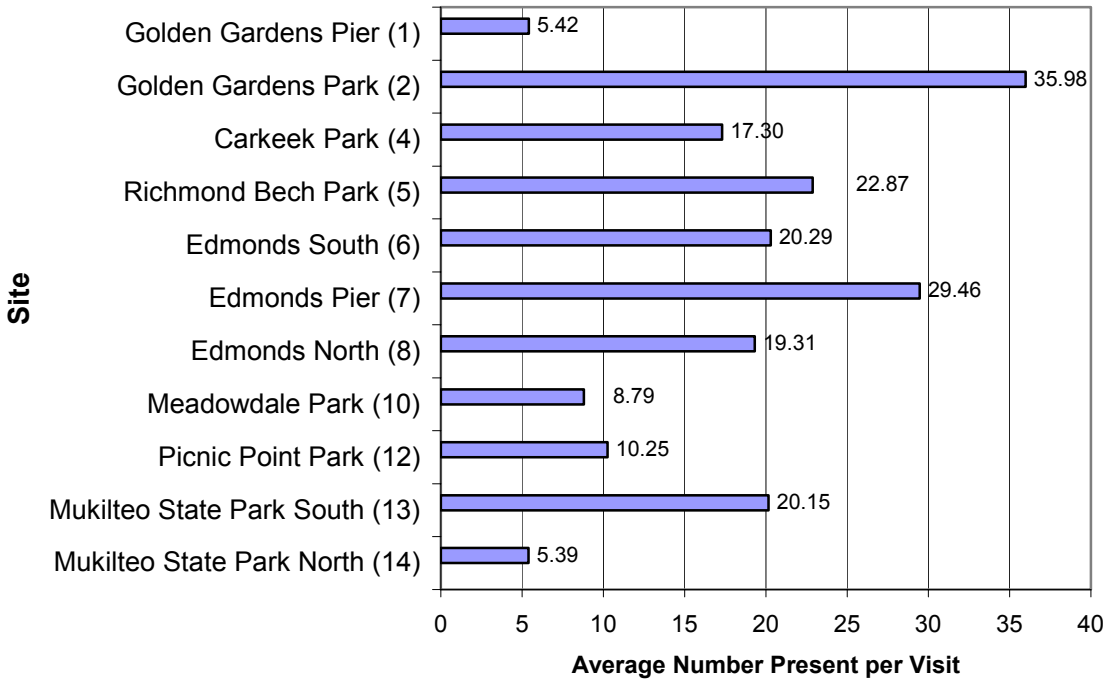


Table 3
Number of People Observed per Visit By Site Location

Location Number	N	Mean	Standard deviation	Min	Max	Total # of people observed	Site #'s with significantly different mean number of visitors/day (p<0.05)
Golden Gardens Pier (1)	53	5.42	7.49	0	40	287	2, 7
Golden Gardens Park (2)	45	35.98	58.09	0	350	1619	1, 4, 10, 12, 14
Carkeek Park (4)	50	17.30	32.09	0	204	865	2
Richmond Bech Park (5)	38	22.87	27.85	0	143	869	None
Edmonds South (6)	49	20.29	27.07	0	104	994	None
Edmonds Pier (7)	41	29.46	27.75	0	111	1208	1, 10, 12, 14
Edmonds North (8)	45	19.31	27.71	0	157	869	None
Meadowdale Park (10)	43	8.79	13.80	0	59	378	2, 7
Picnic Point Park (12)	51	10.25	14.03	0	58	523	2, 7
Mukilteo State Park South (13)	54	20.15	27.74	0	115	1088	None
Mukilteo State Park North (14)	46	5.39	6.18	0	33	248	2, 7
Total	**515**	**17.37**	**29.07**	**0**	**350**	**8948**	

Figure 6. Average Number of People Present Per Visit by Season

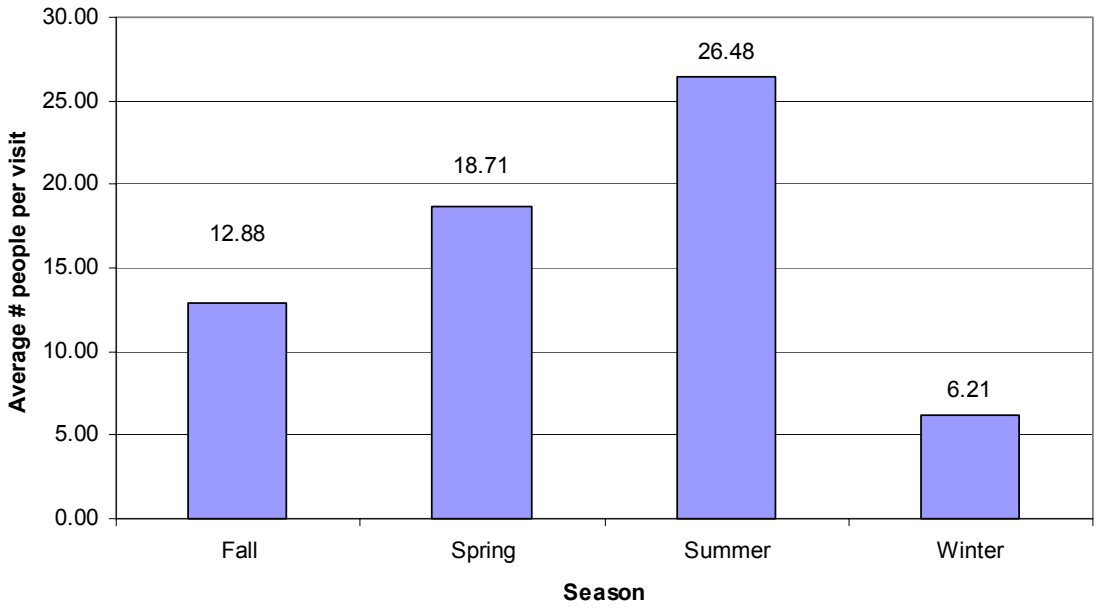
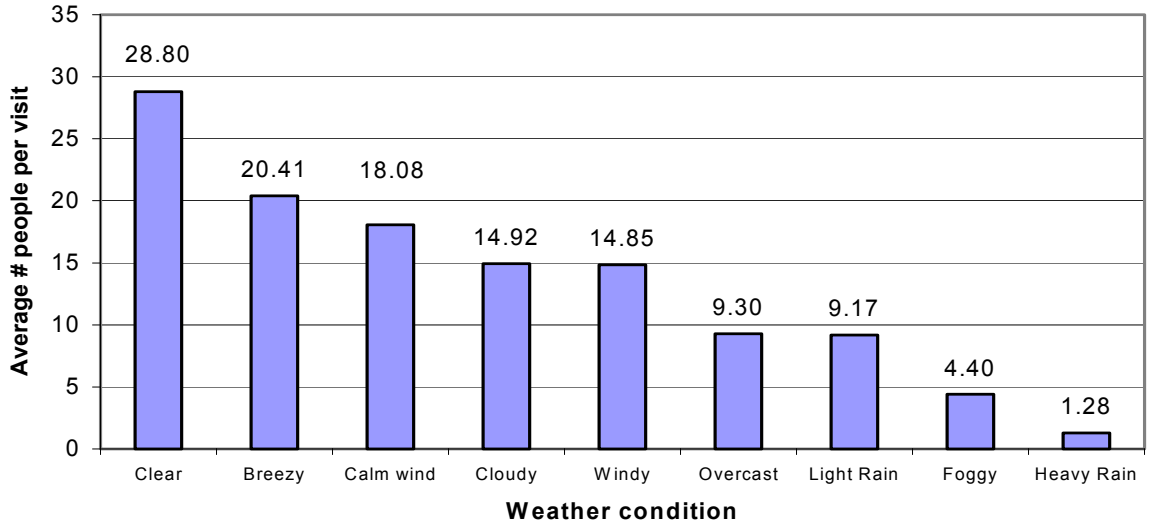


Figure 7. Average Number of People Present Per Visit by Weather Condition



In addition to recording the number of people present at each site, the activities that people were engaged in were also recorded. The activities were grouped into four categories: sand/sediment activities, water-contact activities, fishing activities, boating activities. Sand/sediment activities included sitting/reading, walking/hiking, running, picnicking/barbecuing/bonfire, digging in the sand away from the water, and a few other activities (i.e., photography, feeding birds, exercise or sports). Water contact activities included swimming (full body), wading (legs only), scuba diving, surfing (wind or other), digging in sand near water, and snorkeling. Fishing activities included fishing from a boat, fishing from the shore or pier, and harvesting shellfish. Boating activities were recorded based on the surveyor's ability to count the number of people on the boat, thus necessitating that the boat be relatively near the shoreline of the site location. The boats observed included motorboats, sailboats, kayaks, canoes, rafts and jet-skis. The percent of people engaged in each activity (within a category) is presented in Tables 4, 5, 6 and 7 and Figures 8, 9, 10 and 11.

Sand/sediment activities accounted for approximately 67% of the people observed during the survey (Table 4). Water contact, fishing and boating activities accounted for 16%, 14%, and 3% of the people observed, respectively. The most frequently observed sand/sediment activities were sitting on the beach (40%) and walking/hiking on the beach (38%). The most frequently observed activities in the other three categories were digging in the sand near the water (50%), fishing from pier/shore (78%) and boating in a motor-boat (66%), respectively.

Generally, the percentages of people engaged in the various sand/sediment activities were relatively consistent across survey sites. For example, the distribution of the two most frequently observed beach activities, sitting or walking, was between 29-57% and 28-51%, respectively (Table 4). Water contact activities followed a similar pattern, with the exception of scuba diving. Sites 6 and 8 in Edmonds and sites 13 and 14 in Mukilteo

were found to have approximately 77% and 18% of all the scuba divers observed (Table 5). Fishing and boating activities tended to vary considerably from site to site. Fishing activities were highest at locations with established fishing piers (i.e., Golden Gardens Pier (1), Edmonds Pier (7), Mukilteo State Park South (13), and Mukilteo State Park North (14)) (Table 6).

The ACS forms also allowed for a general count of the number of people engaged in activities by age group. Surveyors counted the number of people and assigned them to one of three age groups using judgement. The age categories included children, teenagers, and adults. The number of people observed by age group and activity category is presented in Table 8 and Figure 12. The numbers of people observed by age group was variable from site to site and activity category. Children, teenagers and adults accounted for 26%, 14%, and 60% of the sand/sediment activities, 49%, 9% and 42% of the water-contact activities, 8%, 8% and 84% of the fishing activities, and 1%, 9% and 90% of the boating activities.

3.1.1 Summary

The results of the Activity Count Surveys showed that the numbers of people present varied between sites and was dependent on season and weather conditions. The sites with the most frequent human use were located in the Edmonds area followed by Golden Gardens Park and Mukilteo State Park. Sand/Sediment activities were most frequently observed, followed by water-contact activities, fishing and boating. The ten activities with the highest number of people observed during the survey are detailed in Table 9. These activities included (in order from highest to lowest): sitting on the beach, walking/hiking on the beach, fishing from shore or pier, digging in sand (in/near water), picnicking/barbecuing on beach, digging in sand (away from water), wading (legs only), scuba diving, fishing from boat, and boating (motorized). The people observed in these activities were primarily adults, with the exception of digging (in and away from water) and wading, which were dominated by young children.

3.2 Water and Shoreline Use Survey

During each one-hour site visit, the surveyors attempted to interview as many people as possible. Interviews were conducted using the questions on the SUS form (Attachment A). This survey form was used to record information about each respondent's age, ethnicity, intended activity, and the frequency and duration of the intended activity. The surveyors interviewed 1171 people with the SUS form. The number of surveys collected by site is presented in Figure 13.

Table 4
Number and Percent of People Engaged In Sand/Sediment Activities by Site Location

Location Number	Total # Observed	# (%) Sitting on beach	# (%) Walking/ Hiking	# (%) Running	# (%) Picnicking/ BBQ	# (%) Digging in Sand Away from Water	# (%) Other Sand Activities
Golden Gardens Pier (1)	39	12 (31%)	19 (49%)	1 (3%)	0 (0%)	2 (5%)	5 (13%)
Golden Gardens Park (2)	1274	464 (36%)	417 (33%)	10 (1%)	254 (20%)	99 (8%)	30 (2%)
Carkeek Park (4)	694	241 (35%)	341 (49%)	3 (0%)	52 (7%)	56 (8%)	1 (0%)
Richmond Bech Park (5)	728	273 (38%)	324 (45%)	10 (1%)	44 (6%)	70 (10%)	7 (1%)
Edmonds South (6)	743	323 (43%)	205 (28%)	21 (3%)	72 (10%)	92 (12%)	30 (4%)
Edmonds Pier (7)	318	133 (42%)	123 (39%)	1 (0%)	5 (2%)	56 (18%)	0 (0%)
Edmonds North (8)	500	206 (41%)	209 (42%)	3 (1%)	16 (3%)	62 (12%)	4 (1%)
Meadowdale Park (10)	333	172 (52%)	118 (35%)	5 (2%)	18 (5%)	16 (5%)	4 (1%)
Picnic Point Park (12)	435	128 (29%)	224 (51%)	5 (1%)	62 (14%)	14 (3%)	2 (0%)
Mukilteo State Park South (13)	803	351 (44%)	234 (29%)	11 (1%)	158 (20%)	37 (5%)	12 (1%)
Mukilteo State Park North (14)	90	51 (57%)	29 (32%)	2 (2%)	0 (0%)	3 (3%)	5 (6%)
Total	5957	2354 (40%)	2243 (38%)	72 (1%)	681 (11%)	507 (9%)	100 (2%)

Figure 8. Number of People Engaged in Sand/Sediment Activities by Site Location

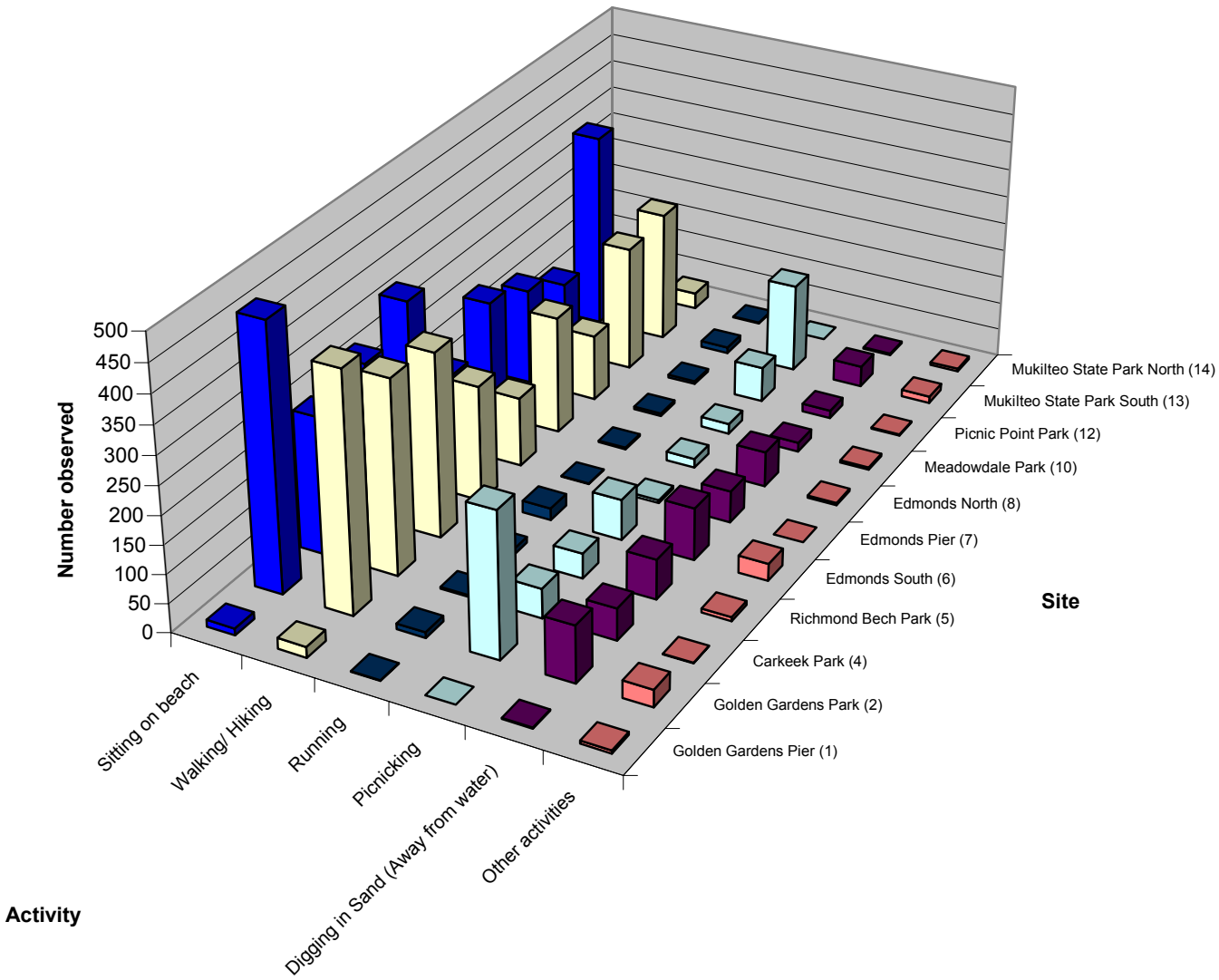


Table 5
Number and Percent of People Engaged In Water-Contact Activities by Site Location

Location Number	Total # Observed	# (%) Swimming	# (%) Wading	# (%) Scuba Diving	# (%) Surfing	# (%) Digging in Sand Near Water	# (%) Snorkeling
Golden Gardens Pier (1)	4	0 (0%)	0 (0%)	0 (0%)	4 (100%)	0 (0%)	0 (0%)
Golden Gardens Park (2)	259	2 (1%)	102 (39%)	9 (3%)	8 (3%)	138 (53%)	0 (0%)
Carkeek Park (4)	166	1 (1%)	47 (28%)	2 (1%)	5 (3%)	111 (67%)	0 (0%)
Richmond Bech Park (5)	129	2 (2%)	45 (35%)	7 (5%)	4 (3%)	69 (53%)	2 (2%)
Edmonds South (6)	211	5 (2%)	43 (20%)	43 (20%)	0 (0%)	120 (57%)	0 (0%)
Edmonds Pier (7)	120	2 (2%)	24 (20%)	0 (0%)	0 (0%)	94 (78%)	0 (0%)
Edmonds North (8)	367	0 (0%)	27 (7%)	210 (57%)	6 (2%)	124 (34%)	0 (0%)
Meadowdale Park (10)	43	1 (2%)	15 (35%)	0 (0%)	0 (0%)	27 (63%)	0 (0%)
Picnic Point Park (12)	34	1 (3%)	19 (56%)	0 (0%)	0 (0%)	14 (41%)	0 (0%)
Mukilteo State Park South (13)	75	11 (15%)	17 (23%)	12 (16%)	0 (0%)	35 (47%)	0 (0%)
Mukilteo State Park North (14)	46	0 (0%)	0 (0%)	46 (100%)	0 (0%)	0 (0%)	0 (0%)
Total	1454	25 (2%)	339 (23%)	329 (23%)	27 (2%)	732 (50%)	2 (<1%)

Figure 9. Number of people engaged in water contact activities by site location

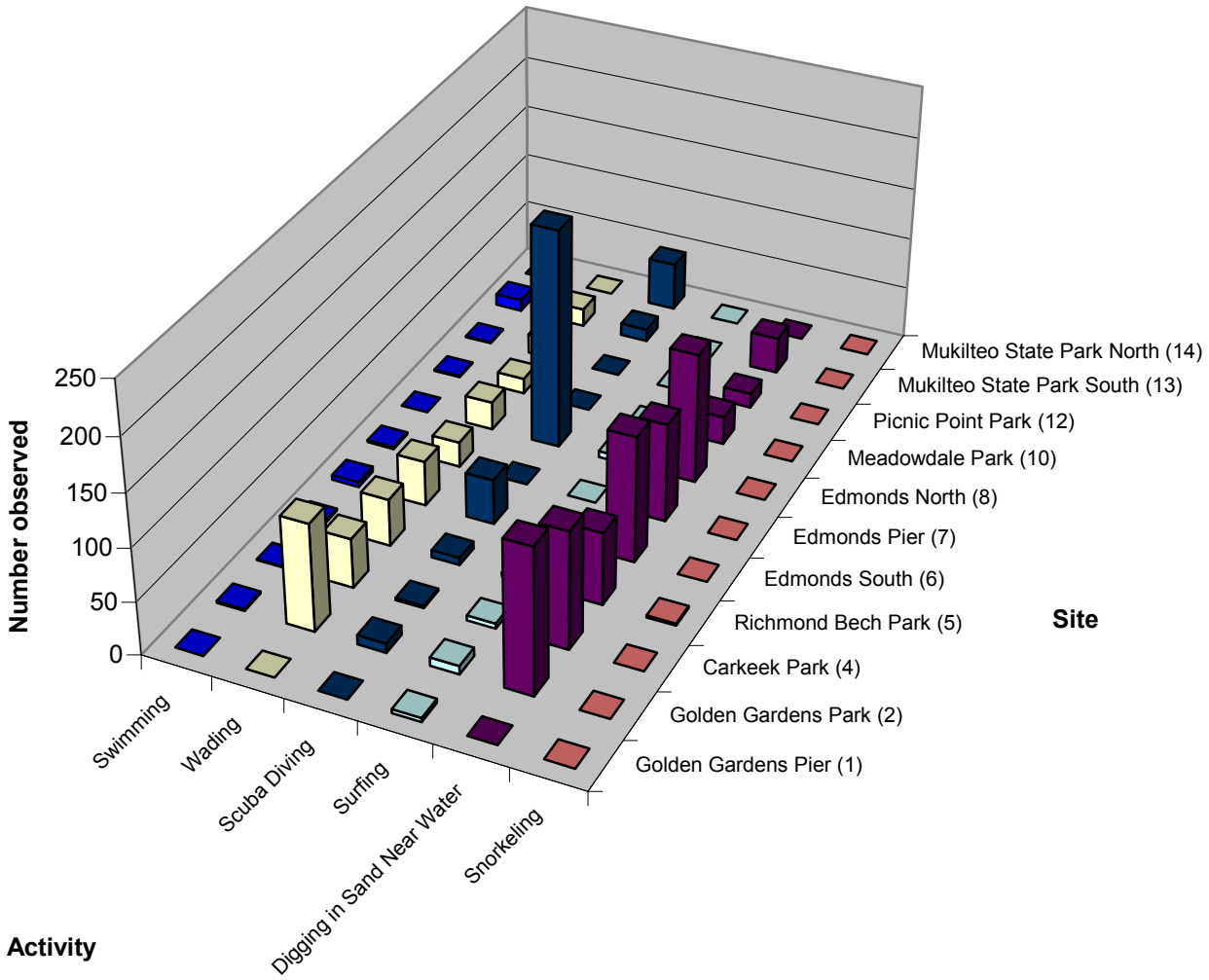


Table 6
Number and percent of people engaged in fishing activities by site location

Location Number	Total # Observed	# (%) Fishing from Boat	# (%) Fishing from Shore/Pier	# (%) Harvesting Shellfish
Golden Gardens Pier (1)	165	57 (35%)	101 (61%)	7 (4%)
Golden Gardens Park (2)	5	3 (60%)	2 (40%)	0 (0%)
Carkeek Park (4)	4	2 (50%)	0 (0%)	2 (50%)
Richmond Bech Park (5)	7	1 (14%)	6 (86%)	0 (0%)
Edmonds South (6)	30	25 (83%)	0 (0%)	5 (17%)
Edmonds Pier (7)	770	26 (3%)	737 (96%)	7 (1%)
Edmonds North (8)	2	2 (100%)	0 (0%)	0 (0%)
Meadowdale Park (10)	1	0 (0%)	1 (100%)	0 (0%)
Picnic Point Park (12)	50	33 (66%)	14 (28%)	3 (6%)
Mukilteo State Park South (13)	143	67 (47%)	58 (41%)	18 (13%)
Mukilteo State Park North (14)	112	12 (11%)	87 (78%)	13 (12%)
Total	1289	228 (18%)	1006 (78%)	55 (4%)

Figure 10. Number of people engaged in fishing activities by site location

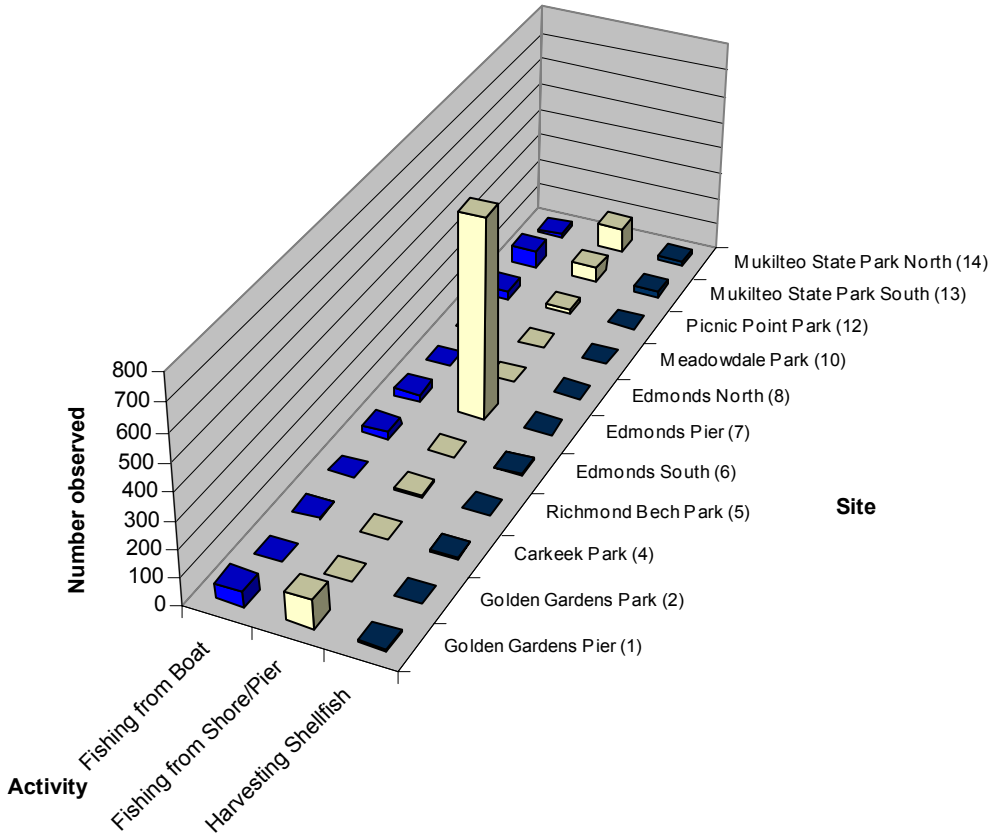


Table 7
Number and Percent of People Engaged In Boating Activities by Site Location

Location Number	Total # Observed	# (%) Motor-Boat	# (%) Sailboat	# (%) Kayak	# (%) Canoe	# (%) Jetski	# (%) Raft
Golden Gardens Pier (1)	79	30 (38%)	38 (48%)	9 (11%)	2 (3%)	0 (0%)	0 (0%)
Golden Gardens Park (2)	81	70 (86%)	2 (2%)	7 (9%)	2 (2%)	0 (0%)	0 (0%)
Carkeek Park (4)	1	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)
Richmond Bech Park (5)	5	4 (80%)	0 (0%)	1 (20%)	0 (0%)	0 (0%)	0 (0%)
Edmonds South (6)	10	0 (0%)	4 (40%)	6 (60%)	0 (0%)	0 (0%)	0 (0%)
Edmonds Pier (7)	0	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Edmonds North (8)	0	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Meadowdale Park (10)	1	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)
Picnic Point Park (12)	4	4 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Mukilteo State Park South (13)	67	55 (82%)	7 (10%)	3 (4%)	0 (0%)	2 (3%)	0 (0%)
Mukilteo State Park North (14)	0	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	248	163 (66%)	51 (21%)	27 (11%)	4 (2%)	2 (1%)	1 (<1%)

Figure 11. Number of people engaged in boating activities by site location

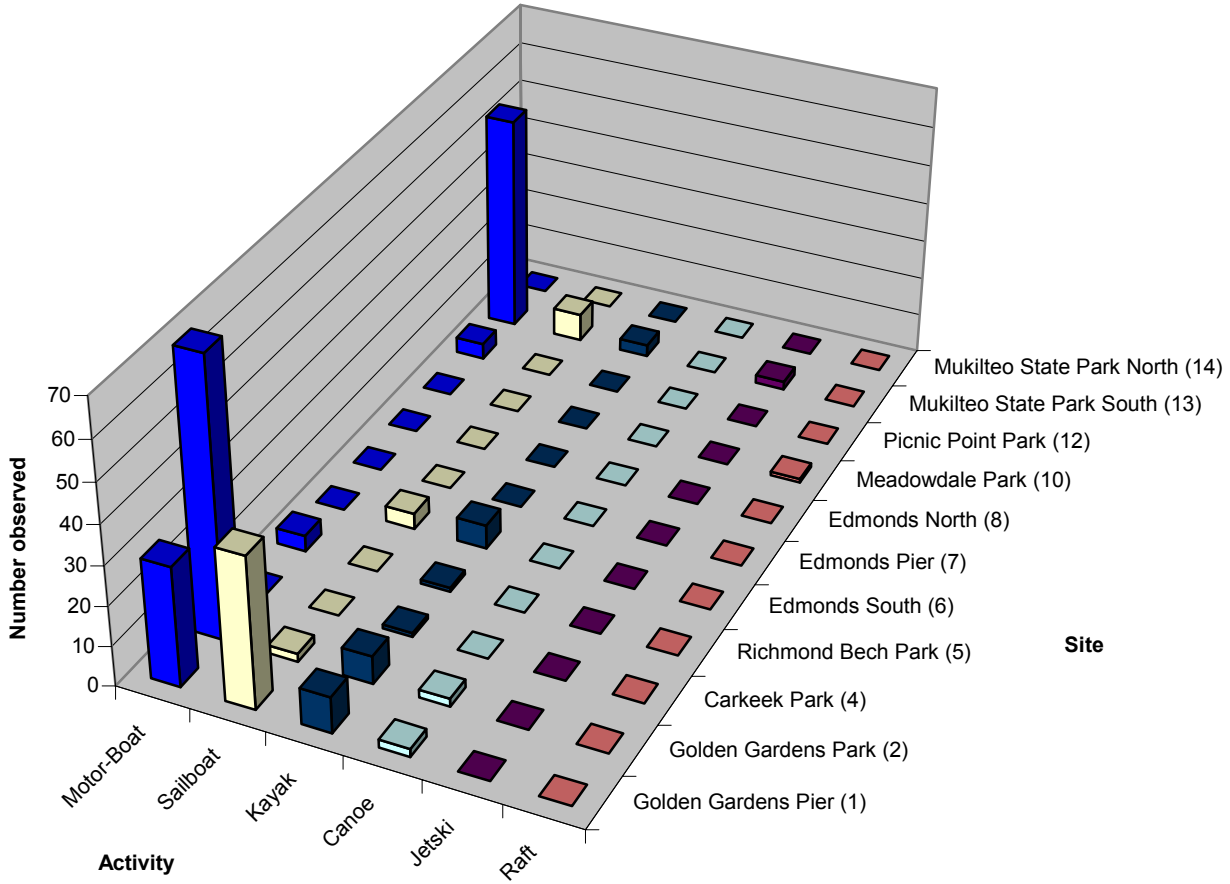


Table 8
Number of people observed in each activity category by age group

Location Number	Sand/Sediment Activities			Water-Contact Activities			Fishing Activities			Boating Activities		
	Child	Teen	Adult	Child	Teen	Adult	Child	Teen	Adult	Child	Teen	Adult
Golden Gardens Pier (1)	4	2	33	0	0	4	17	6	142	0	2	77
Golden Gardens Park (2)	302	184	788	164	24	71	0	0	5	0	20	61
Carkeek Park (4)	188	96	410	97	23	46	0	0	4	0	0	1
Richmond Bech Park (5)	170	100	458	64	29	36	0	0	7	0	0	5
Edmonds South (6)	202	112	429	131	10	70	2	0	28	0	0	10
Edmonds Pier (7)	89	33	196	76	12	32	62	83	625	0	0	0
Edmonds North (8)	143	63	294	97	14	256	0	0	2	0	0	0
Meadowdale Park (10)	79	64	190	28	9	6	0	0	1	0	0	1
Picnic Point Park (12)	102	81	252	18	1	15	0	0	50	0	0	4
Mukilteo State Park South (13)	225	102	476	44	5	26	7	8	128	2	1	64
Mukilteo State Park North (14)	30	4	56	0	0	46	18	9	85	0	0	0
Total	1534	841	3582	719	127	608	106	106	1077	2	23	223

Figure 12. Number of people engaged in each activity class by age

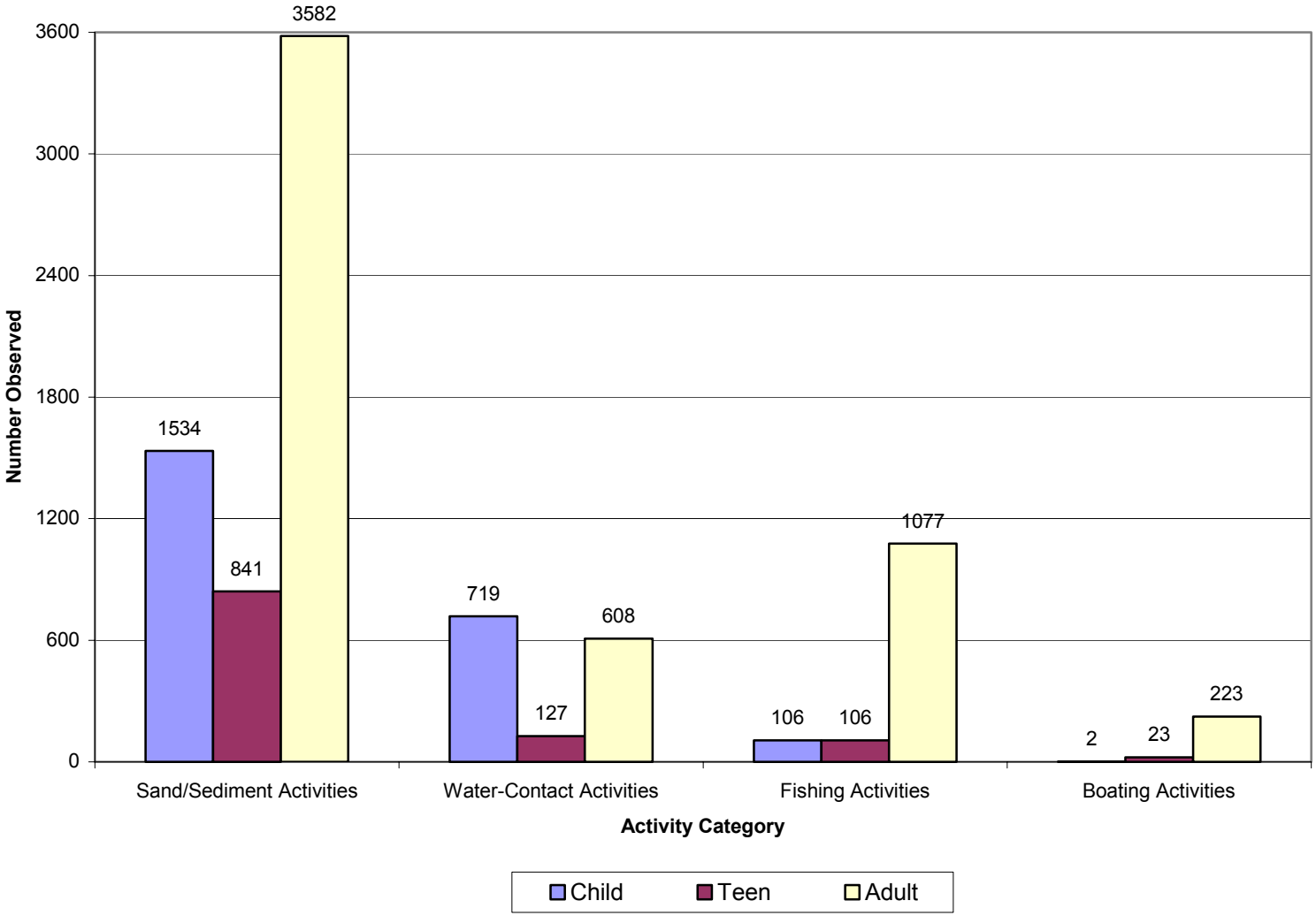
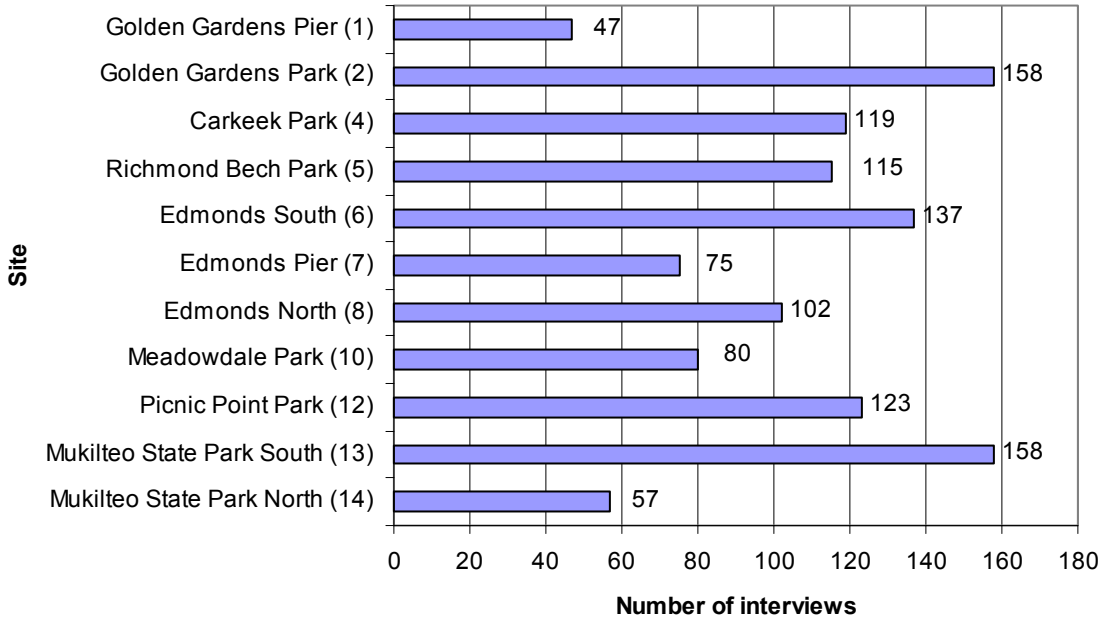


Table 9
Most frequently observed activities

Activity	Number (%) of people observed (N=8948)			
	Total	Child	Teen	Adult
Sitting on the beach	2354 (26.3%)	427 (18.1%)	378 (16.1%)	1549 (65.8%)
Walking/Hiking on the beach	2243 (25.1%)	445 (19.8%)	238 (10.6%)	1560 (69.6%)
Fishing from shore or pier	1006 (11.2%)	95 (9.4%)	100 (10.0%)	811 (80.6%)
Digging in sand (in/near water)	732 (8.2%)	528 (72.1%)	53 (7.3%)	151 (20.6%)
Picnicking or Barbecuing on beach	681 (7.6%)	166 (24.4%)	175 (25.7%)	340 (49.9%)
Digging in sand (away from water)	507 (5.7%)	433 (85.4%)	24 (4.7%)	50 (9.9%)
Wading (legs only)	339 (3.8%)	166 (49.0%)	68 (20.0%)	105 (31.0%)
Scuba diving	329 (3.7%)	5 (1.5%)	3 (0.9%)	321 (97.6%)
Fishing from boat	228 (2.5%)	7 (3.1%)	6 (2.6%)	215 (94.3%)
Boating (motorized)	163 (1.8%)	1 (0.6%)	23 (14.1%)	139 (85.3%)

Figure 13. Number of Interviews by Site



The number of people agreeing to complete the survey was 1119, resulting in a response rate of approximately 95.6%. Five of the surveys were completed with the surveyor indicating a language barrier, while no completed interviews were repeat contacts. Fifty-two people refused to complete the interview (4.4%). Eight of the non-respondents were found to have a language barrier and one non-respondent was a repeat contact. A summary of the interview status of all the SUS surveys is reported in Table 10.

Table 10
Interview Status from the Water and Shoreline Use Survey

Survey Status	Number of respondents	% of total
Agreed to interview	1119	95.6 %
• Language barrier	5	<1 %
• Repeat contact	0	0 %
Declined interview	52	4.4 %
• Language barrier	8	<1 %
• Repeat contact	1	<1 %
Total	1171	

The respondent's age, gender and ethnicity were also recorded during each survey. The number of completed surveys varied by age group (Figure 14), with the largest number of interviews collected from people ages 31-40 (N=302). Interviews conducted with children below age 10 were administered to the parents that were present with the child. Approximately 54% of the respondents were male (N=606), 45% were female (N=505), and eight survey forms did not have the gender recorded (<1%). The ethnicity of the respondents (Table 11) was primarily Caucasian (84.7 %) followed by Japanese (2.2%), Asian (unspecified) (1.7%), African American (1.8%) and Vietnamese (1.6%). A variety of other ethnic groups were also reported.

Figure 14. Number of Interviews by Age Group

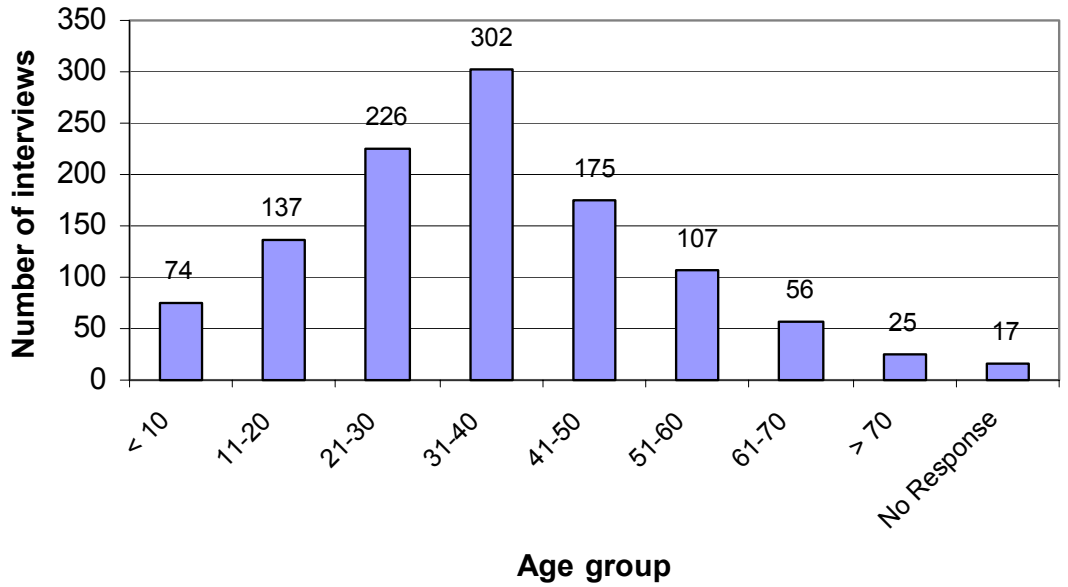


Table 11
Ethnicity of Respondents

Ethnicity Self Described as:	Number of respondents	% of total
Caucasian	948	84.7%
Asian and Pacific Islander		
• *Japanese*	25	2.2%
• *Asian (unspecified)*	19	1.7%
• *Filipino*	18	1.6%
• *Vietnamese*	15	1.3%
• *Korean*	7	0.6%
• *Chinese*	7	0.6%
• *Pacific Islander*	2	0.2%
• *Cambodian*	1	0.1%
African American	20	1.8%
No response	18	1.6%
Hispanic	16	1.4%
Mixed	12	1.1%
Native American	8	0.7%
Other	3	0.3%
Total	1119	

A wide variety of activities were reported during the interviews (Table 12), with walking on the beach (32.7%) and sitting on the beach (17%) being reported most frequently. Following the identification of the intended recreational activity, the surveyors questioned the respondents about the duration and frequency of their intended activity. The average number of hours the respondents engaged in each activity is presented in Table 13. The number of hours spent was primarily dependent on the activity. The activities with the shortest (0.53 hours) and longest (4.66 hours) mean duration (all sites) were 'throwing rocks' and 'boating (non-motor)'. The duration for each activity was variable between sites. Analysis of variance tests were used to compare the number of hours engaged by location, age, gender and ethnicity (Table 14). Only the top ten activities were analyzed due to sample size restrictions. In most cases, there was no significant difference ($p<0.05$) between the number of hours spent and the other variables. The number of hours spent by the ≤ 10 age group was found to be significantly less than other groups for walking and running activities. Respondents were found to picnic longer at Carkeek Park than at Richmond Beach Park or Parks in the Edmonds area. Caucasian respondents were found to dig in the sand (away from the water) at greater lengths than Asian respondents. Hispanic respondents were found to fish longer than Caucasian respondents. Finally, male respondents were found to wade in the water longer than female respondents.

Survey respondents were asked to identify any other sites in the project area where they frequently visited (Table 15). In general, respondents identified other locations that were relatively close to the survey site where they were interviewed. For example, 48.3% of people interviewed at Golden Gardens Park mentioned they frequently visited Carkeek Park, while only 5.0% visited Mukilteo State Park, approximately 20 miles away. The most regularly mentioned secondary sites, in descending order were: Edmonds (Sites 6,7,8), Golden Gardens (Sites 1,2), Richmond Beach Park (Site 5), Carkeek Park (Site 4), Picnic Point Park (Site 12), Mukilteo State Park (Sites 13, 14) and Meadowdale Park (Site 10).

Table 12
Frequency of responses by shoreline activity

Activity	Number of respondents**	% of total
Walking on the beach	520	32.7%
Sitting/reading on the beach	270	17.0%
Digging in the sand (in/near the water)	140	8.8%
Picnicking/barbecuing/sitting by fire	114	7.2%
Digging in the sand (away from the water)	76	4.8%
Sunbathing	73	4.6%
Fishing (shore/pier)	69	4.3%
Wading (legs only)	54	3.4%
Running	52	3.3%
Scuba Diving	47	3.0%
Playing sports/games (e.g., volleyball, frisbee)	37	2.3%
Hiking	30	1.9%
Boating (non-motor)	18	1.1%
Collecting seashells/rocks	16	1.0%
Shellfish harvesting	16	1.0%
Fishing (on boat)	14	0.88%
Swimming (full body)	12	0.75%
Boating (motor)	6	0.38%
Nature observation	6	0.38%
Surfing / windsurfing	6	0.38%
Throwing rocks	4	0.25%
Photography	3	0.19%
Other (sightseeing)	2	0.13%
Other (collecting glass)	1	0.06%
Other (passing out flyers)	1	0.06%
Other (waiting for ferry)	1	0.06%
Other (watching dog)	1	0.06%
Other (prayer)	1	0.06%
No Response	1	0.06%

**Total number of responses (N=1592) is greater than the number of completed interviews (N=1119) because some people reported more than one activity per visit.

Table 13
Number of hours engaged in each activity by site

	All Sites Combined							Golden Gardens (Sites 1 & 2)			Carkeek Park (Site 4)			Richmond Beach (Site 5)		
Activity	***N***	***Mean***	***SD***	***Min***	***Max***	***50th Percentile***	***95th Percentile***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***
Walking on the beach	505	1.10	0.63	0.08	6	1	2	79	1.06	0.60	60	1.15	0.60	61	1.09	0.80
Sitting/reading on the beach	261	1.46	0.95	0.17	7	1	3	44	1.59	0.76	20	1.69	1.01	31	1.42	0.67
Digging in sand (in/near water)	136	1.15	0.72	0.08	3.50	1	2.18	25	1.03	0.61	19	1.11	0.86	8	0.91	0.71
Picnicking / Barbecuing / Sit by fire	113	2.50	1.75	0.25	8	2	6.50	22	2.68	2.02	15	3.70	2.38	13	1.77	1.58
Digging in sand (away from water)	74	0.87	0.53	0.08	2.50	1	2	15	1.07	0.65	11	0.69	0.47	12	0.77	0.35
Fishing (shore/pier)	69	2.70	1.08	0.42	5.50	3	4.80	6	2.65	1.71	--	--	--	3	1.83	1.89
Sunbathing	62	2.37	1.54	0.50	7.50	2	4.98	10	2.13	1.20	5	2.70	2.71	6	2.42	0.68
Wading (legs only)	50	1.16	0.93	0.25	4	1	3.28	7	0.69	0.30	6	1.83	1.37	5	1.20	0.76
Scuba diving	47	1.79	1.29	0.50	8	2	3.85	2	0.67	0	--	--	--	--	--	--
Running	44	0.92	0.50	0.17	2.50	1	1.59	12	1.15	0.69	6	0.92	0.56	2	1.25	0.35
Sports/games	37	1.72	1.16	0.17	5.50	1.50	3.80	10	1.80	0.75	1	3	--	2	3.13	3.36
Hiking	23	1.06	0.80	0.20	3	0.75	2.90	--	--	--	2	0.40	0.14	3	0.57	0.40
Boating (non-motor)	16	4.66	2.51	0.50	8	5	8	9	5.22	2.62	1	5.50	--	1	2.50	--
Collecting seashells/rocks	16	0.88	0.72	0.13	2.50	0.50	2.13	1	2	--	--	--	--	4	1	1
Fishing (boat)	16	4.03	2.24	1	10	4	7	5	5	3.10	--	--	--	--	--	--
Swimming (full body)	16	1.47	1.28	0.50	5	1	4.25	3	1.67	0.58	2	2.75	1.77	1	0.50	--
Shellfish harvesting	15	2.45	2.12	0.17	8	2.25	6.13	6	3.19	2.94	1	0.63	--	--	--	--
Nature Observation	6	1.33	0.41	1	2	1.25	1.88	--	--	--	2	1.50	0	1	1	--
Boating (motor)	5	2.63	3.08	0.17	6	0.50	6	1	0.17	--	--	--	--	--	--	--
Surfing / windsurfing	5	2.30	1.82	1	5.50	1.50	4.80	1	1.50	--	1	1	--	1	2	--
Throwing rocks	4	0.53	0.33	0.25	1	0.44	0.93	--	--	--	--	--	--	3	0.38	0.13
Photography	3	2	2.18	0.50	4.50	1	4.15	--	--	--	2	2.75	2.47	1	0.50	--

Table 13
Number of Hours Engaged in Each Activity by Site (continued)

	Edmonds Area (Sites 6, 7 & 8)			Meadowdale Park (Site 10)			Picnic Point Park (Site 12)			Mukilteo State Park (Sites 13 & 14)		
Activity	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***
Walking on the beach	120	1.04	0.62	42	1.23	0.46	68	1.10	0.65	75	1.15	0.64
Sitting/reading on the beach	71	1.41	1.02	19	1.20	0.64	30	1.64	1.03	46	1.33	1.16
Digging in sand (in/near water)	41	1.01	0.71	3	1.20	0.61	14	1.52	0.54	23	1.41	0.78
Picnicking / Barbecuing / Sit by fire	12	1.38	0.92	6	3.33	2.36	19	2.20	1.09	26	2.55	1.24
Digging in sand (away from water)	30	0.84	0.52	3	1	0	3	1	0.87	--	--	--
Fishing (shore/pier)	27	2.91	1.03	1	2	--	4	2.38	0.75	28	2.68	0.95
Sunbathing	12	1.75	0.89	6	1.33	1.33	13	3.22	1.88	9	2.72	1.37
Wading (legs only)	11	0.98	1.03	4	1.15	0.77	9	0.97	0.32	8	1.50	1.28
Scuba diving	33	1.86	1.43	--	--	--	--	--	--	12	1.79	0.88
Running	12	0.69	0.33	6	1	0.35	1	0.25	--	5	0.85	0.14
Sports/games	6	0.85	0.66	5	1.50	1	3	1.83	1.04	10	1.83	1.20
Hiking	2	1	0.71	8	1.46	0.83	4	0.80	0.56	4	1.25	1.19
Boating (non-motor)	3	4.50	2.60	1	0.50	--	1	5.50	--	--	--	--
Collecting seashells/rocks	8	0.82	0.55	--	--	--	3	0.50	0.65	--	--	--
Fishing (boat)	1	1	--	--	--	--	--	--	--	10	3.85	1.58
Swimming (full body)	2	0.75	0.35	1	0.50	--	--	--	--	7	1.50	1.55
Shellfish harvesting	7	2	1.35	--	--	--	--	--	--	1	3	--
Nature Observation	2	1.50	0.71	--	--	--	1	1	--	--	--	--
Boating (motor)	--	--	--	--	--	--	--	--	--	4	3.25	3.18
Surfing / windsurfing	1	5.50	--	--	--	--	--	--	--	1	1.50	--
Throwing rocks	--	--	--	1	1	--	--	--	--	--	--	--
Photography	--	--	--	--	--	--	--	--	--	--	--	--

Table 14
Statistical Comparisons of Activity, Location, Age, Gender And Ethnicity

Activity	Location	Age Group	Gender	Ethnicity
Walking on the beach	No differences among sites	≤10 < all groups [1] (except 11-20, 31-40 and 61-70)	No differences between genders	No differences among ethnicities
Sitting/reading on the beach	No differences among sites	21-30 > 31-40 [1]	No differences between genders	No differences among ethnicities
Digging in sand (in/near water)	No differences among sites	No differences among age groups	No differences between genders	No differences among ethnicities
Picnicking / Barbecuing / Sit by fire	Carkeek Pk > Ricmond Beach [1] Carkeek Pk > Edmonds (Sites 6,7,8) [1]	No differences among age groups	No differences between genders	No differences among ethnicities
Digging in sand (away from water)	No differences among sites	No differences among age groups	No differences between genders	Caucasian > Asian [1]
Fishing (shore/pier)	No differences among sites	No differences among age groups	No differences between genders	Hispanic > Caucasian [1]
Sunbathing	No differences among sites	No differences among age groups	No differences between genders	No differences among ethnicities
Wading (legs only)	No differences among sites	No differences among age groups	Male > Female [1]	No differences among ethnicities
Scuba diving	No differences among sites	No differences among age groups	No differences between genders	No differences among ethnicities
Running	No differences among sites	≤10 < 31 – 40 [1] ≤10 < 41 – 50 [1]	No differences between genders	No differences among ethnicities

[1] Groups indicated in each category are significantly less/greater than the other indicated group during an ANOVA test of the mean number of hours engaged in each activity ($p<0.05$) (See Attachment B for SPSS output).

Table 15
Frequency of Visiting Site Locations Other Than the Site Where the Survey was Completed

		Other Frequently Visited Sites (Number of responses / Percent of Total)							
		Golden Gardens Park (Sites 1 & 2)	**Carkeek Park (Site 4)**	**Richmond Beach Park (Site 5)**	**Edmonds Area (Sites 6, 7 & 8)**	**Meadowdale Beach Park (Site 10)**	**Picnic Point Park (Site 12)**	**Mukilteo State Park (Sites 13 & 14)**	**Total**
Interview Site	Golden Gardens Park (Sites 1 & 2)	--	87 (48.3%)	54 (30.0%)	17 (9.4%)	6 (3.3%)	7 (3.9%)	9 (5.0%)	180
	Carkeek Park (Site 4)	90 (46.9%)	--	45 (23.4%)	52 (27.1%)	3 (1.6%)	0 (0.0%)	2 (1.0%)	192
	Richmond Beach Park (Site 5)	50 (31.6%)	37 (23.4%)	--	65 (41.1%)	1 (0.6%)	1 (0.6%)	4 (2.5%)	158
	Edmonds Area (Sites 6, 7 & 8)	71 (21.4%)	46 (13.9%)	93 (28.0%)	--	38 (11.4%)	49 (14.8%)	35 (10.5%)	332
	Meadowdale Beach Park (Site 10)	14 (9.7%)	5 (3.5%)	19 (13.2%)	66 (45.8%)	--	24 (16.7%)	16 (11.1%)	144
	Picnic Point Park (Site 12)	24 (11.5%)	15 (7.2%)	23 (11.1%)	56 (26.9%)	38 (18.3%)	--	52 (25.0%)	208
	Mukilteo State Park (Sites 13 & 14)	34 (16.2%)	13 (6.2%)	6 (2.9%)	75 (35.7%)	17 (8.1%)	65 (30.9%)	--	210
	Total	283 (19.9%)	203 (14.3%)	240 (16.9%)	331 (23.2%)	103 (7.2%)	146 (10.3%)	118 (8.3%)	1424

Next, the respondents were asked to identify the frequency (days per month, months per year) that they participate in all activities within the project area (Tables 16 and 17). The activities most and least often performed each month were 'running' (13.60 days per month) and 'collecting seashells/rocks' (2.45 days/per month). The activities most and least often performed each year were 'photography' (12 months/year) and 'sunbathing' (3.41 months/year).

In addition to determining the average number of months spent engaging in each activity, data was collected on which months people typically engaged in each activity. Generally, most of the respondents reported engaging in each of the activities during the summer months (Table 18). However, several activities were found to occur uniformly throughout the year (e.g., walking, running).

3.2.1 Summary

The results of the shoreline use survey (SUS) correspond with the activity count survey. The activities reported with the highest frequency (i.e., walking or sitting on the beach) in the ACS made up most of the interviews recorded on the SUS forms. Information on the duration and frequency of various activities engaged in by people in the Puget Sound area was characterized. The time spent and frequency of visits throughout the year varied by activity, and in some cases by site. This information will be useful in determining if people may be exposed to chemicals from the marine outfall at rates that could pose a health risk. This issue is further examined in the human health risk assessment.

In addition to identifying recreational patterns, respondents were asked to identify the destinations within the project area that they visited most frequently. The Edmonds area (Sites 6,7,8) had the most surveys collected, and was also reported to be visited most often by people interviewed at other sites. Golden Gardens Park had the second most number of surveys collected and was frequently identified as a place of recreation by people interviewed at other sites.

Table 16
Number of Days Per Month Engaged in Each Activity

	All Sites Combined					Golden Gardens Park (Sites 1 & 2)			Carkeek Park (Site 4)			Richmond Beach Park (Site 5)		
Activity	***N***	***Mean***	***SD***	***Min***	***Max***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***
Walking on beach	562	7.43	7.61	0.50	30	82	7.77	8.36	66	6.04	6.35	70	6.43	5.34
Sitting/reading on beach	264	5.16	5.10	0.50	30	46	5.40	5.86	26	6.38	5.53	32	4.52	3.08
Picnicking / barbecuing / sitting by fire	168	3.23	2.88	1	20	28	3.36	2.69	26	3	2.77	17	3.15	2.42
Digging in sand (in/near water)	122	4.02	4.45	0.50	28	23	3.24	2.48	20	4.03	3.66	6	4.42	0.66
Fishing (shore/pier)	68	7.17	7.16	1	30	6	7	11.35	--	--	--	3	7.50	8.67
Digging in sand (away from water)	62	4.41	3	1	19	14	4.04	2.49	10	3.25	1.14	9	4.28	1.15
Sunbathing	60	5.82	3.85	1	17.50	10	4.75	2.99	7	6.86	3.59	5	3.10	2.48
Sports/Games	53	5.57	4.99	0.50	20	14	3.36	1.85	1	3	--	5	4.20	3.82
Scuba diving	52	3.52	3.52	0.01	20	2	3	0	1	1	--	1	1	--
Running	46	13.60	9.48	2	30	11	16.33	7.53	4	7.17	5.48	2	16	5.66
Wading (legs only)	44	4.45	5.52	1	30	4	3.88	1.25	6	3.75	3.27	5	2.70	1.15
Swimming (full body)	26	6.40	6.60	0.50	30	5	3.20	1.52	4	7.50	7.62	1	4.50	--
Hiking	21	4.79	2.65	1	12	2	5.50	0.71	2	4.50	0.71	4	7.25	4.48
Boating (non-motor)	20	5.10	3.04	1	12.50	11	5.64	3.44	1	8	--	1	3.50	--
Shellfish Harvesting	16	4.47	4.21	1	15	6	2.33	2.16	1	8	--	--	--	--
Collecting seashells/rocks	12	2.45	2.08	1	8	1	NR	--	--	--	--	3	4	3.46
Fishing (from boat)	12	5.50	5.22	1	20	5	8.30	7.45	--	--	--	--	--	--
Boating (motor)	8	4.50	2.25	2	7.50	1	7.50	--	--	--	--	--	--	--
Nature observation	7	8.21	7.87	1	25	1	25	--	2	6	0	1	4	--
Surfing/Windsurfing	6	7.83	6.15	1	17.50	1	7.50	--	1	3.50	--	1	5	--
Photography	3	7.33	10.98	0.50	20	--	--	--	2	10.25	13.79	1	1.50	--
Throwing rocks	2	4.25	1.06	3.50	5	--	--	--	--	--	--	1	3.50	--

Table 16
Number of Days Per Month Engaged in Each Activity (continued)

	Edmonds Area (Sites 6, 7 & 8)			Meadowdale Beach Park (Site 10)			Picnic Point Park (Site 12)			Mukilteo State Park (Sites 13 & 14)		
Activity	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***
Walking on beach	133	7.58	8.23	53	9.29	8.58	74	7.59	7.23	84	7.49	8
Sitting/reading on beach	73	4.92	5.16	15	5.87	7.01	27	3.91	3.33	45	5.59	5.31
Picnicking / barbecuing / sitting by fire	22	3.93	3.42	11	1.77	0.96	29	2.88	1.48	35	3.67	4.01
Digging in sand (in/near water)	35	5.68	7.08	2	5.75	3.18	14	2.57	1.75	22	2.93	2.26
Fishing (shore/pier)	27	8.28	8.20	1	2	--	4	7.88	3.71	27	6.15	5.43
Digging in sand (away from water)	26	4.52	3.39	1	3.50	--	1	10	--	1	15	--
Sunbathing	12	5.96	4.05	6	5.75	1.89	13	7.45	4.06	7	5.50	6.31
Sports/Games	10	6.35	6.04	6	5.58	4.13	5	11.10	8.28	12	5.96	4.86
Scuba diving	36	3.97	4.11	--	--	--	--	--	--	12	2.67	0.94
Running	13	10.54	10.48	6	15.33	11.99	2	12	5.66	7	15.64	11.36
Wading (legs only)	11	4.95	7.03	5	8	12.36	5	3.70	1.48	8	3.86	1.38
Swimming (full body)	6	6.70	5.14	2	5	1.41	1	5.50	--	7	8.64	10.43
Hiking	2	3	2.83	5	4	2.55	3	3.83	0.29	3	4.67	1.89
Boating (non-motor)	5	3.90	2.07	1	1.50	--	1	7.50	--	--	--	--
Shellfish Harvesting	7	5	5.32	--	--	--	--	--	--	2	7.25	3.89
Collecting seashells/rocks	7	1.93	1.24	--	--	--	1	1.50	--	--	--	--
Fishing (from boat)	--	--	--	--	--	--	--	--	--	7	3.50	1.35
Boating (motor)	2	2	0	--	--	--	--	--	--	5	4.90	1.82
Nature observation	2	7.75	3.18	--	--	--	1	1	--	--	--	--
Surfing/Windsurfing	2	15	3.54	--	--	--	--	--	--	1	1	--
Photography	--	--	--	--	--	--	--	--	--	--	--	--
Throwing rocks	--	--	--	1	5	--	--	--	--	--	--	--

Table 17
Number of Months Per Year Engaged in Each Activity

	All Sites Combined					Golden Gardens Park (Sites 1 & 2)			Carkeek Park (Site 4)			Richmond Beach Park (Site 5)		
Activity	***N***	***Mean***	***SD***	***Min***	***Max***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***
Walking on beach	562	9.95	3.36	1	12	82	9.92	3.51	66	10.31	3.07	70	10.20	3.05
Sitting/reading on beach	264	7.10	4.11	1	12	46	7	4.08	26	7.32	3.96	32	6.69	3.95
Picnicking / barbecuing / sitting by fire	168	4.59	2.79	1	12	28	4.07	2.54	26	3.61	1.92	17	4.53	2.48
Digging in sand (in/near water)	122	7.70	3.92	2	12	23	9.61	3.45	20	9.32	3.70	6	6.50	4.28
Fishing (shore/pier)	68	7.96	4.33	1	12	6	9.40	3.58	--	--	--	3	6.33	5.51
Digging in sand (away from water)	62	7.81	3.74	2	12	14	9.92	3.18	10	8.90	3.35	9	7	3.87
Sunbathing	60	3.41	1.16	1	7	10	3.10	0.88	7	3.71	1.25	5	3.40	0.55
Sports/Games	53	5.50	3.70	1	12	14	3.38	1.26	1	3	--	5	5.80	3.70
Scuba diving	52	10.83	3.15	1	12	2	12	0	1	--	--	1	--	--
Running	46	10.12	3.18	2	12	12	10.91	1.87	4	9	3.46	2	12	--
Wading (legs only)	44	3.93	2.61	1	12	4	3	0	6	2.80	0.45	5	3	0.82
Swimming (full body)	26	4.08	3.13	2	12	5	2.40	0.55	4	6	4.24	1	3	--
Hiking	21	9.35	3.53	3	12	2	12	--	2	8.50	4.95	4	10.50	3
Boating (non-motor)	20	8.15	3.59	3	12	11	8.45	3.70	1	12	--	1	12	--
Shellfish Harvesting	16	6.93	4.14	1	12	6	5	3.85	1	12	--	--	--	--
Collecting seashells/rocks	12	8.08	4.06	2	12	1	12	--	--	--	--	3	7.67	2.31
Fishing (from boat)	12	6	3.13	3	12	5	8	4.69	--	--	--	--	--	--
Boating (motor)	8	6	1.87	3	8	1	NR	--	--	--	--	--	--	--
Nature observation	7	11	2.65	5	12	1	12	--	2	12	0	1	12	--
Surfing/Windsurfing	6	10.50	2.35	7	12	1	7	--	1	8	--	1	12	--
Photography	3	12	0	12	12	--	--	--	2	12	0	1	12	--
Throwing rocks	2	9.50	3.54	7	12	--	--	--	--	--	--	1	12	--

Table 17
Number of Months Per Year Engaged in Each Activity (continued)

	Edmonds Area (Sites 6, 7 & 8)			Meadowdale Beach Park (Site 10)			Picnic Point Park (Site 12)			Mukilteo State Park (Sites 13 & 14)		
Activity	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***	***N***	***Mean***	***SD***
Walking on beach	133	9.73	3.45	53	10.48	3.23	74	10.12	3.23	84	9.39	3.69
Sitting/reading on beach	73	7.15	4.16	15	8.64	4.20	27	7.48	4.32	45	6.62	4.23
Picnicking / barbecuing / sitting by fire	22	5.41	3.32	11	4.40	4.06	29	4.89	2.44	35	4.97	3.01
Digging in sand (in/near water)	35	8.20	3.54	2	7.50	6.36	14	4.15	1.82	22	5.80	4.02
Fishing (shore/pier)	27	7.58	4.82	1	12	--	4	2	0	27	8.71	3.67
Digging in sand (away from water)	26	7.08	3.73	1	3	--	1	NR	--	1	3	--
Sunbathing	12	3.50	1.24	6	2.67	1.03	13	4	1.35	7	3	1.10
Sports/Games	10	5.20	3.79	6	6.20	5.36	5	5.33	2.31	12	8.09	4.13
Scuba diving	36	10.65	3.59	--	--	--	--	--	--	12	11.17	1.80
Running	13	9.31	4.01	6	10.40	3.58	2	9.50	3.54	7	10.71	3.40
Wading (legs only)	11	5	3.13	5	6.20	5.31	5	3	0	8	3.25	0.89
Swimming (full body)	6	4.17	3.87	2	8	5.66	1	4	--	7	3	1.10
Hiking	2	6	4.24	5	10.60	3.13	3	9	5.20	3	8	3.46
Boating (non-motor)	5	6.40	3.78	1	8	--	1	6	--	--	--	--
Shellfish Harvesting	7	7.40	4.28	--	--	--	--	--	--	2	9	4.24
Collecting seashells/rocks	7	8.43	4.61	--	--	--	1	3	--	--	--	--
Fishing (from boat)	--	--	--	--	--	--	--	--	--	7	4.86	1.07
Boating (motor)	2	NR	--	--	--	--	--	--	--	5	6	1.87
Nature observation	2	8.50	4.95	--	--	--	1	12	--	--	--	--
Surfing/Windsurfing	2	12	0	--	--	--	--	--	--	1	12	--
Photography	--	--	--	--	--	--	--	--	--	--	--	--
Throwing rocks	--	--	--	1	7	--	--	--	--	--	--	--

Table 18
Months of the year engaged in each activity (all sites combined)

Activity	Month (Number of Responses / Percent of Total)												
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Walking on beach	371(7%)	372(7%)	397(8%)	433(8%)	469(9%)	510(10%)	514(10%)	507(10%)	465(9%)	420(8%)	377(7%)	369(7%)	5204
Sitting/reading on beach	101(5%)	101(5%)	111(6%)	126(7%)	156(8%)	239(13%)	253(14%)	249(14%)	176(10%)	127(7%)	103(6%)	98(5%)	1840
Picnicking / barbecuing / sitting by fire	15(2%)	15(2%)	23(3%)	43(6%)	67(9%)	140(19%)	158(21%)	156(21%)	67(9%)	24(3%)	16(2%)	15(2%)	739
Digging in sand (in/near water)	50(6%)	50(6%)	54(6%)	67(7%)	79(9%)	113(12%)	116(13%)	114(13%)	91(10%)	75(8%)	51(6%)	49(5%)	909
Digging in sand (away from water)	24(5%)	24(5%)	27(6%)	32(7%)	41(9%)	59(13%)	59(13%)	57(12%)	53(11%)	36(8%)	25(5%)	24(5%)	461
Sunbathing	0(0%)	0(0%)	0(0%)	5(3%)	8(4%)	46(23%)	57(29%)	56(28%)	25(13%)	1(1%)	0(0%)	0(0%)	198
Sports / games	10(4%)	10(4%)	13(5%)	15(6%)	22(8%)	44(17%)	47(18%)	46(17%)	22(8%)	15(6%)	10(4%)	10(4%)	264
Running	30(7%)	30(7%)	35(8%)	36(8%)	38(9%)	42(10%)	43(10%)	43(10%)	39(9%)	38(9%)	31(7%)	30(7%)	435
Scuba diving	43(8%)	43(8%)	44(8%)	44(8%)	43(8%)	45(9%)	41(8%)	41(8%)	43(8%)	45(9%)	44(8%)	44(8%)	520
Wading (legs only)	4(2%)	3(2%)	3(2%)	6(4%)	9(5%)	34(21%)	41(25%)	40(24%)	12(7%)	7(4%)	3(2%)	3(2%)	165
Fishing (shore/pier)	23(6%)	24(6%)	29(8%)	31(8%)	32(9%)	37(10%)	40(11%)	43(11%)	39(10%)	28(7%)	25(7%)	23(6%)	374
Swimming (full body)	3(3%)	3(3%)	3(3%)	3(3%)	6(6%)	18(18%)	25(25%)	25(25%)	6(6%)	4(4%)	3(3%)	3(3%)	102
Boating (non-motor)	8(5%)	8(5%)	12(7%)	12(7%)	15(9%)	20(12%)	20(12%)	20(12%)	16(10%)	14(9%)	10(6%)	8(5%)	163
Hiking	12(6%)	13(7%)	13(7%)	17(9%)	18(10%)	20(11%)	20(11%)	19(10%)	17(9%)	14(7%)	12(6%)	12(6%)	187
Shellfish Harvesting	5(5%)	5(5%)	5(5%)	7(7%)	10(10%)	14(14%)	13(13%)	13(13%)	10(10%)	5(5%)	5(5%)	5(5%)	97
Collecting seashells/rocks	5(5%)	5(5%)	7(7%)	8(8%)	8(8%)	11(11%)	12(12%)	12(12%)	9(9%)	8(8%)	7(7%)	5(5%)	97
Fishing (boat)	2(3%)	2(3%)	2(3%)	4(6%)	7(11%)	11(17%)	11(17%)	11(17%)	7(11%)	4(6%)	3(5%)	2(3%)	66
Nature observation	6(8%)	6(8%)	6(8%)	7(9%)	7(9%)	7(9%)	7(9%)	7(9%)	6(8%)	6(8%)	6(8%)	6(8%)	77
Surfing / Windsurfing	4(6%)	4(6%)	6(10%)	6(10%)	6(10%)	6(10%)	6(10%)	6(10%)	6(10%)	5(8%)	4(6%)	4(6%)	63
Boating (motor)	0(0%)	0(0%)	2(7%)	2(7%)	3(10%)	5(17%)	5(17%)	5(17%)	4(13%)	3(10%)	1(3%)	0(0%)	30
Photography	3(8%)	3(8%)	3(8%)	3(8%)	3(8%)	3(8%)	3(8%)	3(8%)	3(8%)	3(8%)	3(8%)	3(8%)	36
Throwing rocks	1(5%)	1(5%)	1(5%)	2(11%)	2(11%)	2(11%)	2(11%)	2(11%)	2(11%)	2(11%)	1(5%)	1(5%)	19

3.3 Seafood Consumption Survey

Surveyors, upon completion of the ACS form, interviewed as many anglers as possible using the Seafood Consumption Survey (SCS) form. This survey form was used to record information about each angler's age, ethnicity, intended catch, and the frequency and duration of the seafood collection activity. A total of 149 surveys were attempted during the year (Figure 15). A total of 137 (91.9%) anglers agreed and completed the SCS form. Four of the respondents who completed the SCS forms were identified as having a language barrier and four were repeat contacts. The interview status of all attempted surveys is described in Table 19. Analysis of all following parameters were based on the subset of the data that included only completed SCS forms that were not repeat contacts (i.e., 133 individual data points were used).

Figure 15. Number of Interviews by Survey Site

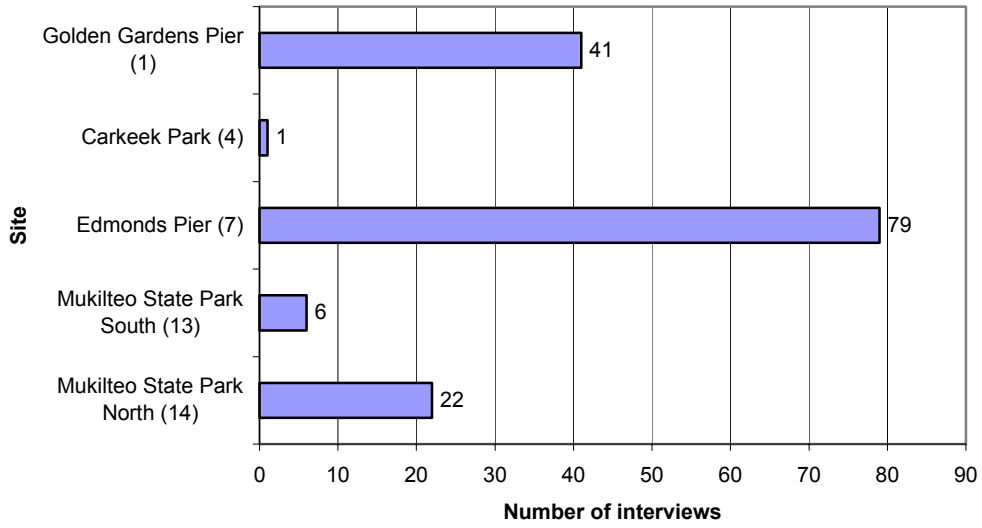
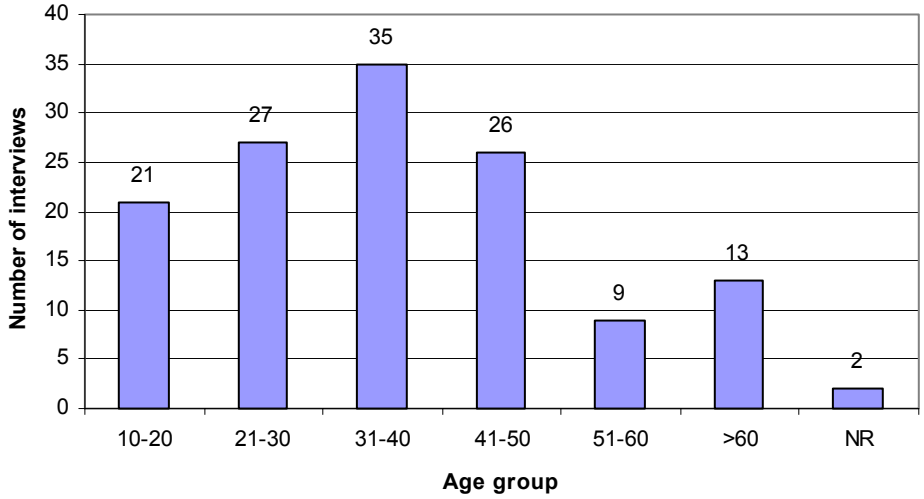


Table 19
Interview status from the seafood consumption survey

Survey Status	Number of respondents	% of total
Agreed to interview	137	91.9%
• Language barrier	4	2.7%
• Repeat contact	4	2.7%
Declined interview	12	8.1%
• Language barrier	4	2.7%
• Repeat contact	0	0.0%
Total	149	

Figure 16. Number of Interviews by Age Group



Demographic information for the 133 unique respondents was characterized. Approximately 87.2% of the respondents were male (N=116), 12.0% were female (N=16), and one survey form did not have the gender recorded. The majority of the respondents were in the '31-40' age group, followed by the '21-30' and '41-50' age groups (Figure 16). Similar to the SUS analysis, the ethnicity of the SCS respondents (Table 20) was primarily Caucasian (53.4%). A variety of other ethnic groups were identified with Asian (unspecified) (12.0%), Hispanic (6.8%) and African American (5.3%) representing the next highest groups reported.

Table 20
Ethnicity of Respondents

Ethnicity	Number of respondents	% of total
Self described as:		
Caucasian	71	53.4%
Asian and Pacific Islander		
• *Asian (unspecified)*[1]	16	12.0%
• *Pacific Islander*	5	3.8%
• *Filipino*	4	3.0%
• *Japanese*	4	3.0%
• *Korean*	2	1.5%
• *Vietnamese*	2	1.5%
• *Cambodian*	1	0.8%
• *Chinese*	1	0.8%
• *Laotian*	1	0.8%
Hispanic	9	6.8%
African American	7	5.3%
Mixed	5	3.8%
Native American	4	3.0%
No response	1	0.8%
Total	133	

[1] Respondent's did not identify a specific ethnic origin, and the surveyor did not probe for more specific information

The angler demographics found during this survey are very similar to those reported in other surveys of marine anglers in the Puget Sound Area. Respondents from others surveys were primarily male (56 – 98%) (Landolt et al. 1987; McCallum 1985; Simmonds et al. 1998). The majority of the anglers surveyed were also between the ages of 20 – 50 (Landolt et al. 1987; McCallum 1985; Simmonds et al. 1998). Respondents in the surveys collected by McCallum (1985) and Simmonds et al. (1998) were also primarily Caucasian. Asian and African American respondents made up the next two highest reported ethnic groups.

The current seafood consumption survey began with a query as to what type of seafood the respondents intended to catch. The majority of the respondents (75.7%) were attempting to catch fish, followed by crabs (20.1%), shrimp (2.3%) or other organisms (2.0%) (Figure 17). Fish and crabs were also the intended catch most reported in other Puget Sound surveys (McCallum 1985; Simmonds et al. 1998). The combined group of anglers reported spending an average of 3.71 hours per visit collecting seafood, with the Edmonds area having the longest average use (4 hours per visit) (Table 21). Analysis of variance tests ($p<0.05$) revealed that no significant differences in the number of hours fishing occurred when compared by location, age, gender or ethnicity.

Figure 17. Percent of People by Intended Catch

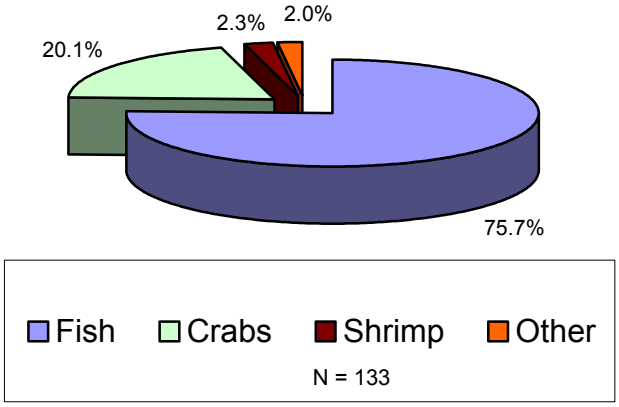


Table 21
Number of Hours Collecting Seafood by Site Interviewed

Location	N	Mean	SD	Min	Max
Golden Gardens Park (1)	37	3.29	1.66	0.50	8
Carkeek Park (4)	1	1.00	--	1	1
Edmonds Pier (7)	72	4.00	2.42	1	12
Mukilteo State Park (13 & 14)	23	3.53	1.99	0.50	9
All Sites	133	3.71	2.18	0.50	12

The respondents reported collecting seafood from the site where they were interviewed an average of 6.13 days per month (Table 22). Excluding the one sample at Carkeek Park, the Edmonds area was again found to have the highest frequency. Analysis of variance tests ($p<0.05$) revealed that no significant differences in the number of days per month fishing occurred when compared by location, age, gender or ethnicity.

Table 22
Number of Days Per Month Collecting Seafood By Site

Location	N	Mean	SD	Min	Max
Golden Gardens Park (1)	37	4.74	4.96	0.08	24
Carkeek Park (4)	1	8.00	--	8	8
Edmonds Pier (7)	72	6.86	6.53	0.08	30
Mukilteo State Park (13 & 14)	23	5.92	7.98	0.08	28
All Sites	133	6.13	6.41	0.08	30

The anglers were then asked to estimate how many days per month and how many months per year they collect seafood from all sites within the project area. The respondents collected seafood an average of 7.37 days per month at all sites in the project area (Table 23). The Edmonds area was again reported to have the highest number of visits per month (8.31 days/month). The highest reported frequency of visits by number of months per year was found at Mukilteo State Park (8.05 months per year) (Table 24). The overall average across all sites was 6.48 months per year. The anglers were also questioned about which months of the year that they typically collect seafood. The responses (Figure 18) showed that while the respondents collect seafood year-round, they tended to increase their frequency during the summer months. This finding is supported by other surveys of anglers collecting seafood in the Puget Sound region (Landolt et al. 1987; Simmonds et al. 1998).

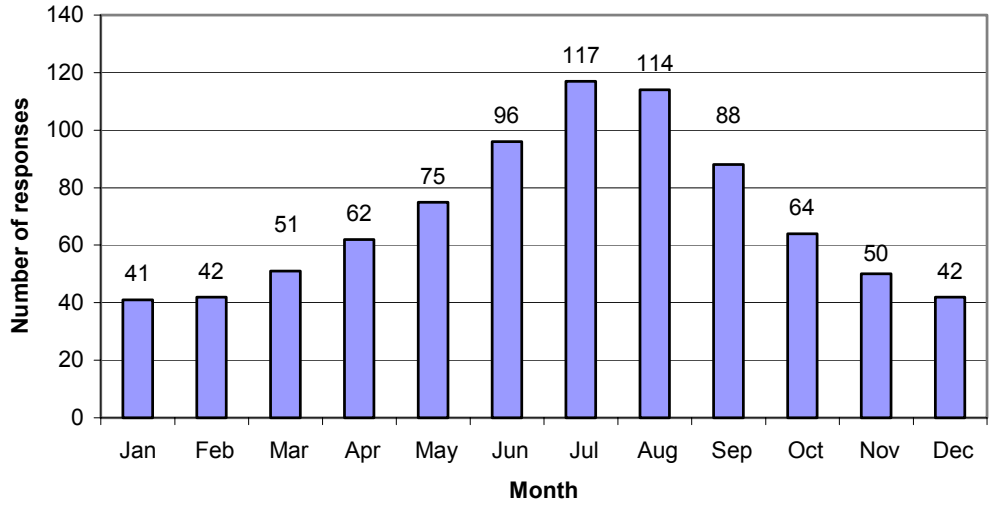
Table 23
Number of days per month collecting seafood by site

Location	N	Mean	SD	Min	Max
Golden Gardens Park (1)	34	5.09	5.05	1	25
Carkeek Park (4)	1	8.00	--	8	8
Edmonds Pier (7)	71	8.31	7.35	1	30
Mukilteo State Park (13 & 14)	21	7.88	8.89	1	30
All Sites	127	7.37	7.15	1	30

Table 24
Number of Months Per Year Collecting Seafood by Site

Location	N	Mean	SD	Min	Max
Golden Gardens Park (1)	36	6.50	3.75	1	12
Carkeek Park (4)	1	7.00	--	7	7
Edmonds Pier (7)	71	5.97	4.02	1	12
Mukilteo State Park (13 & 14)	22	8.05	4.47	1	12
All Sites	130	6.48	4.05	1	12

Figure 18. Months Collecting Seafood During the Year



Anglers were then asked if they frequented any other sites within the project area (Table 25). The majority of the responses (82%) suggested that anglers did not visit any other sites in the area. Other locations were identified between 2 – 6% of the time by anglers. Thus, respondents appear to show a high degree of loyalty to one location.

The next portion of the SCS survey focused on identifying information about what the seafood respondents collected, and what they typically did with their catch. Unfortunately, anglers were often reluctant to allow the survey team to examine their catch. Only 38 of 133 respondents reported a successful catch, and 23 of these allowed the surveyors to measure their catch (Table 26). In addition, anglers were asked to identify anything they had caught in the past week (recall), and only 27 reported they had caught anything and only 18 identified their previous catch (Table 26). Thus, the information on seafood collected during the survey is limited.

Table 25
Other Locations Visited by Anglers

		Other Location					
		Golden Gardens Park (1 & 2)	Edmonds Area (6, 7 & 8)	Picnic Point Park (12)	Mukilteo State Park (13 & 14)	None	Total
Site	Golden Gardens Park (Site 1)	--	3 (9%)	0 (0%)	1 (3%)	31 (88%)	35
	Carkeek Park (Site 4)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)	1
	Edmonds Area (Site 7)	5 (7%)	--	0 (0%)	6 (8%)	62 (85%)	73
	Mukilteo State Park (Site 13 & 14)	1 (5%)	5 (22%)	2 (9%)	--	14 (64%)	22
	All Sites	6 (5%)	8 (6%)	2 (2%)	7 (5%)	108 (82%)	131

Crabs and striped sea perch were found to be the most frequent seafood species collected by the respondents (Table 27). Crabs were also the most commonly reported seafood item collected in the previous week (Table 28). It is important to not that the information in Table 28 is based solely on angler recall of the number and weight of their previous catch, no measurements were made of previous catches. Due to the limited information on seafood, it is difficult to determine what the most common species of fish or shellfish are sought after by marine anglers in the project area. However, it appears that game fish or crabs are frequently caught at Golden Gardens, Edmonds and Mukilteo State Park.

Table 26
Catch Information

	Yes	No	No Response	Total
Have you caught anything today?	38	89	6	133
May I weigh and measure your catch?	23	15	--	38
Have you caught anything in the last week?	27	74	32	133
Can you tell me what you caught?	18	9	--	27

Table 27
Weight and Length of Measured Catch

Site	Species	Number Caught	Mean Length (in.)	Mean Weight (lbs.)	Total Weight (lbs.)[1]
Golden Gardens Pier (1)	Coho Salmon	1	26.00	7.00	7.00
	Red Rock Crab	5	5.90	1.66	8.30
	Striped Sea Perch[2]	11	3.00	NR	--
Edmonds Pier (7)	Crabs				
	Red Rock	4	5.75	0.93[3]	3.72
	Unspecified	8	6.18	1.00	8.00
	Striped Sea Perch	1	7.48	NR	--
	King Salmon	1	26.00	5.00	5.00
	Copper Rock Fish	1	11.00	0.80	0.80
	Flounder	1	11.00	1.00	1.00
	Shrimp	14	4.13	0.30[4]	4.20
Mukilteo State Park (13 & 14)	Dungeness Crab	5	7.06	0.75[5]	3.75
	Rock Sole	1	8.00	0.63	0.63
	Flounder	1	7.00	NR	--

[1] Based on mean weights [2] Perch reportedly used as bait [3] Mean of 3 measured crabs
[4] Mean of 4 measured shrimp [5] Mean of 1 measured crab

Table 28. Weight of Recalled Catch

Site	Species	Number Caught	Mean Weight (lbs)	Total Weight (lbs)[1]
Golden Gardens Pier (1)	Cod	2	NR	--
	Yellowtail	2	NR	--
	Crabs			
	Red Rock	20	0.75[2]	15.00
	Red Cancer	2	1.06	2.12
	Dungeness	5	1.00	5.00
	Perch	1	NR	--
	Salmon	5	10.8	54.00
Carkeek Park (4)	Smelt	NR	NR	--
	Cod	NR	NR	--
Edmonds Pier (7)	Crabs			
	Red Rock	21	1.38	28.98
	Dungeness	17	3	51.00
	Unspecified	2	NR	--
	Salmon	3	10.17	30.51
	Cabezon	1	6.00	6.00
	Rock Cod	1	3.00	3.00
	Sea Perch	3	NR	--
Mukilteo State Park (13 & 14)	Dungeness Crab	24	0.69[3]	16.56

[1] Based on mean weights [2] Mean of 18 measured crabs [3] Mean of 4 crabs

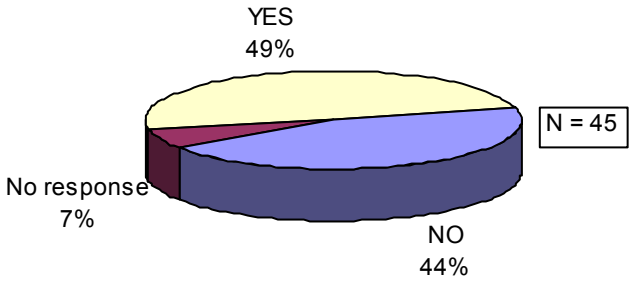
The respondents planned to use their catch in a variety of ways (Table 29). They planned to eat their catch 41.1% of the time followed by sharing with family (17.6%), or capturing and releasing (8.3%). No respondents mentioned that they would sell their catch. Thirty-five of the respondents (26.3%) chose not to provide an answer to this question. The respondents that suggested that they consume the seafood they collect (i.e., responded with 'eat themselves' or 'share with family'), were asked if young children (<10 years of age) also ate seafood they collected. Fifty-two percent of these respondents reported that young children do eat the seafood they collect (Figure 19).

Table 29
Intended Use of Catch By Site

Site	Capture/ Release (N / %)	Eat yourself (N / %)	Give away (N / %)	Use as bait (N / %)	Share with family (N / %)	No Response (N / %)	Total
Golden Gardens Pier (1)	4.33[1] (11.7%)	13.83 (37.4%)	0.50 (1.4%)	3 (8.1%)	6.33 (17.1%)	9 (24.3%)	37
Carkeek Park (4)	1 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1
Edmonds Pier (7)	4 (5.5%)	33.67 (46.8%)	4.50 (6.3%)	0 (0.0%)	11.83 (16.4%)	18 (25.0%)	72
Mukilteo State Park (13 & 14)	1.75 (7.6%)	7.25 (31.5%)	0.75 (3.3%)	0 (0.0%)	5.25 (22.8%)	8 (34.8%)	23
Total	11.08 (8.3%)	54.75 (41.1%)	5.75 (4.3%)	3 (2.3%)	23.42 (17.6%)	35 (26.3%)	133

[1] The respondents often reported more than one intended use, thus, the responses were weighted so that the total sample number equaled the number of respondents (N=133). For example, if one respondent reported 'giving away' and 'using as bait' each response was weighted by 0.5.

Figure 19. Do Children Eat the Seafood You Collect?



During the current survey, the quantification of the amount of seafood the respondents eat from the project area was not directly examined. However, consumption rates were estimated based on several of the questions in the survey. Consumption rates for fish and shellfish for recreational anglers were computed by the following equation and conducted by the following methods:

Consumption Rate (grams/day) = (FF x SR x CC x CW x EF) / 365 (days/year)

FF = Fishing frequency (Days/year)

SR = Fraction of people successfully catching fish/shellfish (unitless)

CC = Fraction of people consuming catch (unitless)

CW = Average weight of measured catch (grams/day)

EF = Edible fraction (0.3 for fish, 0.25 for shellfish)

1) The frequency information (FF), based on question #10 from the seafood consumption survey, was combined to define the number of days per year each survey respondent expected to fish.

2) The frequency data was then sorted based on the type of organism (i.e., fish or shellfish) that the respondent intended to catch. In some cases, a respondent sought both fish and shellfish. In these cases, the frequency data was included in both the fish group and shellfish group.

3) Based on the frequency information, a distribution was developed for anglers attempting to catch fish or shellfish. The frequency data was fit to a lognormal distribution using the BestFit® Software Program (Palisade Corporation). The descriptive statistics of the distributions are reported in Table 30.

Table 30
Lognormal Distribution Descriptives for Fishing Frequency

Descriptives	Fishing Frequency (Days/year)	Shellfish Collecting Frequency (Days/year)
Mean	65.79	67.55
Standard Deviation	139.43	297.00
Minimum	1	1
Maximum	300	360
Percentiles		
10%	5.27	1.62
20%	9.36	3.48
30%	14.16	6.03
40%	20.17	9.65
50%	28.08	14.98
60%	39.08	23.26
70%	55.66	37.23
80%	84.21	64.56
90%	149.51	138.52
95%	240.21	260.24

4) The success rate (SR) was calculated based on the number of people who had successfully caught something at the time of the interview (question #11A of the Seafood Consumption Survey). The values for fish and shellfish were 0.26 and 0.58, respectively.

5) The fraction of people consuming their catch (CC) was based on data collected in question #13A of the Seafood Consumption Survey. The values for fish and shellfish were 0.78 and 0.86, respectively.

6) The average weight of measured catch was based on measurements made during the surveys. The catch data was very limited, and a small number of measurements were actually collected. In some cases, weight data for crabs was missing. The mean weight of the measured catch of the same species was applied to those data points missing weight data. In addition, weight data was absent for one measurement of yellow perch. Length information was available, and weight was estimated based on a length-to-weight relationship presented in Carlisle et al. (1960).

   To estimate the average catch weight, the fish or shellfish data for each surveyor was calculated in total pounds. Then, the average weight of fish or shellfish per angler was calculated and converted to grams. The mean amount per angler was 1035.18 and 682.80 grams/catch-day for fish and shellfish, respectively. Since, the actual number of measurements collected during the survey was limited, there may be some uncertainty with the estimates for this parameter. Therefore, the estimated consumption rates should be interpreted with caution.

7) Finally, the average weight of the catch was adjusted to reflect the portion of the fish or shellfish that is edible. The edible fraction values (0.3 for fish, and 0.25 for shellfish) were similar to those used in other surveys of recreational anglers (Landolt et al. 1985; 1987; Ecology 1999).

The consumption rates calculated following these methods are presented in Table 31. The mean fish and shellfish consumption rates were 11 and 16 grams/day, respectively. Several other surveys have been conducted in the Puget Sound area that estimated fish or shellfish consumption rates (Tables 32 and 33). Some of the surveys measured direct consumption of seafood (U.S. EPA 1997; Sechena et al. 1999; The Suquamish Tribe 2000; Toy et al. 1996), while others estimated consumption based on numerical techniques using variable assumptions (Landolt et al. 1985; 1987; Simmonds et al. 1998). The consumption rates from the current study are similar to other studies of recreational anglers. Recreational anglers in other Puget Sound surveys were reported to consume an average of 2 – 40 g/day, while Native American and Asian groups in the area consumed an average of 42 – 113 g/day. Puget Sound shellfish consumption rates have only been measured during studies of Native American Populations and range from 19-132 g/day. Thus, the results of the current survey show that anglers in the Puget Sound area consume fish or shellfish at rates comparable to other studies. The results tended to be near the lower end of the range of other consumption studies (Figure 20) and therefore suggest

that the study population does not consume seafood at rates comparable to subsistence populations (i.e., Native American Populations).

Table 31
Consumption rates from the current study

Descriptives	Fish Consumption (grams/day)	Shellfish Consumption (grams/day)
Mean	11.40	15.81
Minimum	0.17	0.23
Maximum	52.00	84.27
Percentiles		
10%	0.91	0.38
20%	1.62	0.81
30%	2.45	1.41
40%	3.50	2.26
50%	4.87	3.51
60%	6.77	5.44
70%	9.65	8.71
80%	14.60	15.11
90%	25.91	32.43
95%	41.64	60.92

Table 32
Fish Consumption Rates from Comparable Surveys

Population	Mean Consumption Rate (g/day)	95th percentile Consumption Rate (g/day)	Reference
Piers at Golden Gardens, Edmonds and Mukilteo State Park (Recreational Anglers)	11	42	Current Study
Elliot and Commencement Bays (Recreational Anglers)	11 -- --	-- 246 272	Landolt et al. 1985 Re-analysis by U.S. EPA 1988 Re-analysis by Ecology 1999
Elliot and Commencement Bays (Recreational Anglers)	11-40 --	-- 95	Landolt et al. 1987 Re-analysis by U.S. EPA 1988
Elliot Bay, Everrett Harbor, and Sinclair Inlet (Recreational Anglers)	--	24	Re-analysis by U.S. EPA 1988, based on McCallum 1985
Duwamish River and Elliot Bay (Recreational Anglers)	2.74[1]	6.58	Simmonds et al. 1998 (Fish and Shellfish)
Commencement Bay (Recreational Anglers)	 39 -- --	 146 155 78-147	(Re-analysis of Pierce et al. 1981) U.S. EPA 1989;1997 Price et al. 1994 U.S. EPA 1988
Recreational Marine Anglers (Pacific)	2	6.80	U.S. EPA 1997
General U.S. Population General U.S. Population (re-analysis)	14.10 10.94	63 59.62	U.S. EPA 1997 Jacobs et al. 1998
Asian and Pacific Islander Study	113	246[2]	Sechena et al. 1999
Suquamish Indian Tribe	81	200[2]	The Suquamish Tribe 2000
Tulalip and Squaxin Tribes	42	174	Toy et al. 1996; Ecology 1999

[1] Represents 50th percentile
[2] Represents 90th percentile

Figure 20. Comparison of Fish Consumption Rates

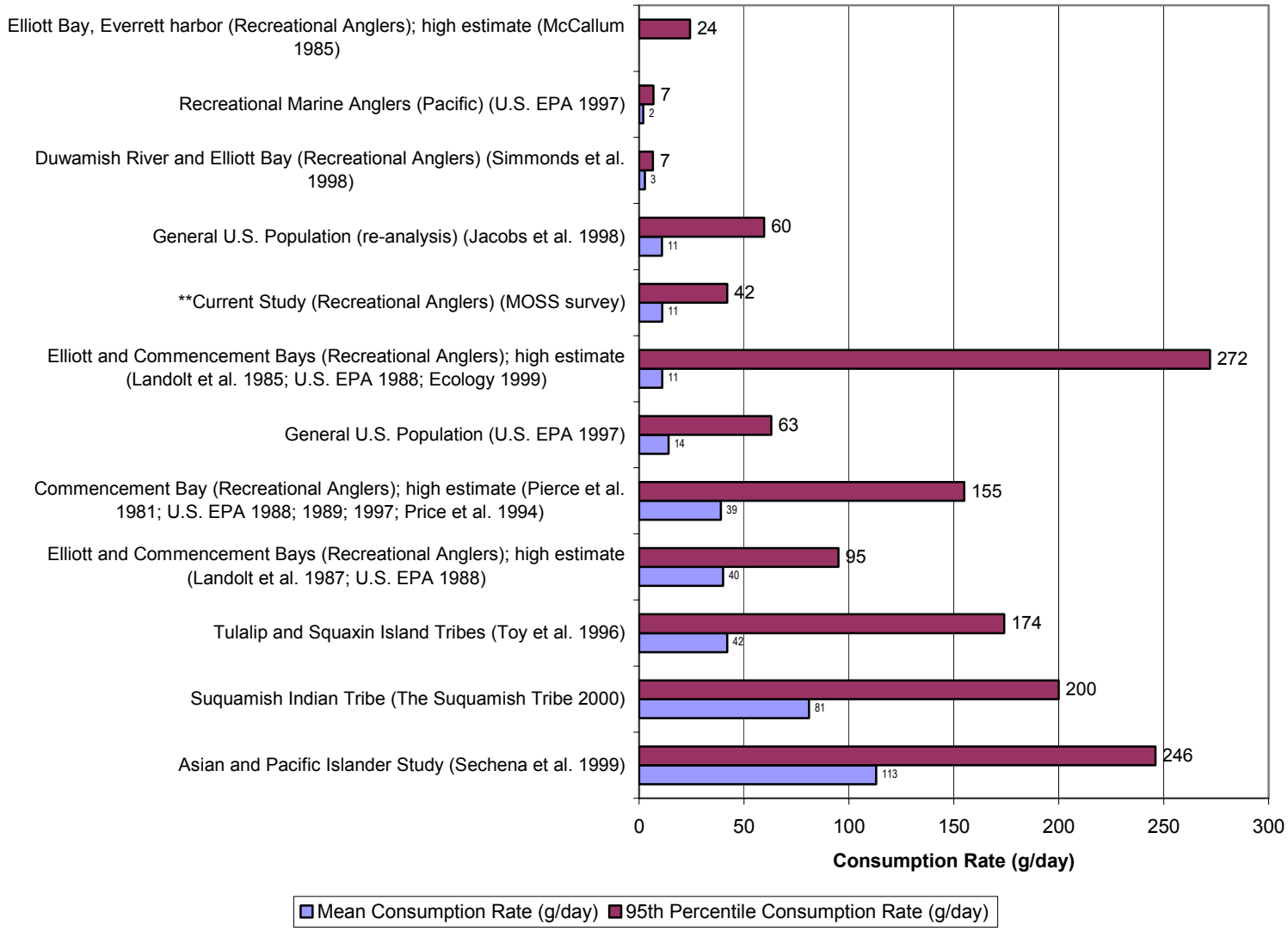


Table 33
Shellfish consumption rates from comparable surveys

Population	Mean Consumption Rate (g/day)	95th percentile Consumption Rate (g/day)	Reference
Piers at Golden Gardens, Edmonds and Mukilteo State Park (Recreational Anglers)	16	61	Current Study
Asian and Pacific Islander Study [1]	54	109[2]	Sechena et al. 1999
Suquamish Indian Tribe	132	362[2]	The Suquamish Tribe 2000
Tulalip and Squaxin Tribes	19	104	Toy et al. 1996; Ecology 1999

[1] Represents 50th percentile

[2] Represents 90th percentile

Finally, the respondents were asked how they prepare the seafood they collect. The majority of the anglers did not respond to this question (Figure 21), however, the most common cooking techniques were baked/fried, boiled or grilled/barbecued. Sixty percent of the respondents claimed they only consumed the fleshy part of the organisms, while 7% reported eating both the flesh and other parts of the organism (Figure 22). These consumption practices are similar to those of other recreational anglers (Simmonds et al. 1998; McCallum 1985) and high consumption groups (Toy et al. 1996; The Suquamish Tribe 2000; Sechena et al. 1999).

Figure 21. Frequency of Responses by Cooking Technique

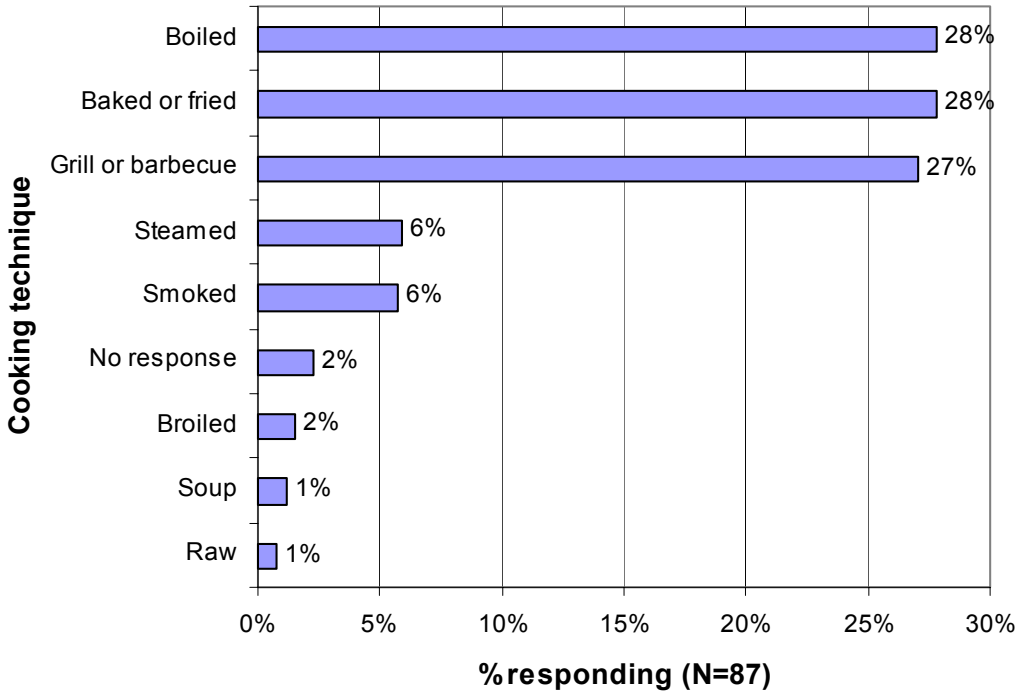
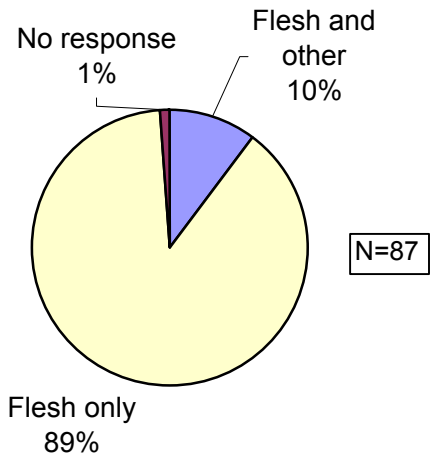


Figure 22. What Parts of the Seafood Respondents Typically Eat



3.3.1 Summary

A limited number of anglers were interviewed during the survey. Golden Gardens Park, Edmonds area (Sites 6,7,8) and Mukilteo State Park are equipped with public fishing piers, and thus the majority of the anglers were interviewed at these locations. Respondents reported that fish or crabs were the most sought after seafood types. Anglers typically spent 3-4 hours fishing during a visit and tended to visit these three sites all year and more frequently in the summer. Forty one percent of the respondents intended on consuming their catch and preferred to eat only the flesh portion. Their preferred cooking methods included baking, frying, boiling or grilling. Over half of the anglers consuming their catch shared with children (< 10 year old).

In contrast to the mobility of other recreational activities, anglers did not report frequent visits to other locations in the project area. Thus, the respondents may be preferential to one location and may also consume sport caught fish from their preferred location. Mean consumption rates for fish or shellfish were 11 grams/day and 16 grams/day, respectively. The 95th percentile consumption rates were 42 grams/day and 61 grams/day for fish and shellfish, respectively. The consumption rates of the survey population are similar to those calculated for recreational anglers in other Puget Sound surveys.

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Appendix A

Survey Forms

SEAFOOD CONSUMPTION SURVEY

Surveyor Name: _____ Survey Date: _____ Form #: SCS - _____

Survey Location: _____ Start Time: _____ End Time: _____

Interview Questions

1A. Interview Status: Agree [ ] Decline [ ]

1B. Interview Status: Language Barrier [ ] Repeat Contact [ ]

2. Age: _____

3. Sex: Male [ ] Female [ ]

4. Ethnicity: Caucasian [ ] African American [ ] Native American [ ]
Vietnamese [ ] Filipino [ ] Japanese [ ]
Chinese [ ] Other: _____

5. What type of seafood are you collecting today? (Check all that apply)
Fish [ ] Mussels [ ] Clams [ ] Sea Cucumbers [ ]
Crabs [ ] Urchins [ ] Algae [ ] Other: _____

6. How many hours have you or will you spend here today collecting seafood? (circle one)

Hours per day = < 1 1 2 3 4 5 6 7 8 9 10 11 12 > 12

7. How often do you collect seafood at this location? (write a number and circle week, month or year)

_____ Visits per (week / month / year)

8. Are there other shoreline locations in North Puget Sound where you frequently collect seafood?

(View map and write down the number(s) of the location(s) where you collect seafood) _____

9. How often do you collect seafood at these locations? (write a number and circle week, month or year)

Seafood: _____ Location: _____ _____ Visits per (week / month / year)
Seafood: _____ Location: _____ _____ Visits per (week / month / year)
Seafood: _____ Location: _____ _____ Visits per (week / month / year)

10. During which months and how many days per month do you collect seafood at all N. Puget Sound locations? (Circle all that apply)

Jan. Feb. March April May June July Aug. Sept. Oct. Nov. Dec.

Days per month (all locations): _____

SEAFOOD CONSUMPTION SURVEY (continued)

11A. Have you collected any seafood today? (Y/N) _____

11B. If yes, may I weigh and measure your catch? (Y/N) _____

11C. Measurement Table:

Species	Length	Weight	Dressed/Gutted (Y/N)

12A. Have you caught any fish/shellfish from the N. Puget Sound area in the past week? (Y/N) _____

12B. If yes, could you tell us the species, number caught and weight of your catch? (Y/N) _____

12C.

Species	Number Caught	Approximate Weight

13A. What do you usually do with the seafood you collect? (check all that apply)

Eat Yourself [ ] Share with family [ ] Sell [ ]
Give away [ ] Capture & Release [ ] Other: _____

13B. If you share with family, will young children (< 10 years of age) eat the seafood? (Y/N) _____

14. How do you prepare the seafood you collect?

Raw [ ] Boiled [ ] Steamed [ ] Other: _____
Soup [ ] Grill [ ] Baked/Fried [ ]

15. What parts of the seafood do you usually consume?

Flesh only [ ] Flesh and other parts [ ]

What other parts (specify separately for fish, shellfish or other seafood types): _____

Other Comments: _____

THANK YOU FOR YOUR TIME!!!!

WATER AND SHORELINE USE SURVEY

Surveyor Name: _____ Survey Date: _____ Form #: SUS - _____

Survey Location: _____ Start Time: _____ End Time: _____

Interview Questions

1A. Interview Status: Agree [ ] Decline [ ]

1B. Interview Status: Language Barrier [ ] Repeat Contact [ ]

2. Age: _____

3. Sex: Male [ ] Female [ ]

4. Ethnicity: Caucasian [ ] African American [ ] Native American [ ]
Vietnamese [ ] Filipino [ ] Japanese [ ]
Chinese [ ] Other: _____

5. What activities will you be undertaking today at this location? (check all that apply)

Walking	[ ]	Fishing (boat)	[ ]
Running	[ ]	Fishing (Shore/Pier)	[ ]
Hiking	[ ]	Shellfish Harvesting	[ ]
Sunbathing	[ ]	Algae Harvesting	[ ]
Picnicking	[ ]	Digging in sand(in/near water)	[ ]
Sitting / Reading	[ ]	Digging in sand(away from water)	[ ]
Wading (legs only)	[ ]	Boating in a motor-boat	[ ]
Swimming (full body)	[ ]	Boating in a non-motorized boat	[ ]
Scuba Diving	[ ]	Type of boat (sailboat, kayak, canoe, etc.)	_____
Surfing / Windsurfing	[ ]	Other Activities	_____

6. How long will you spend today engaging in the above activities at this location? (continue on backside if need
Activity: _____ # of Hours: _____
Activity: _____ # of Hours: _____
Activity: _____ # of Hours: _____

7. Are there any other shoreline locations in N. Puget Sound where you engage in these activities?
(View map and write down the number(s) of the location(s)) _____

8. What specific activities do you undertake at these other locations? _____

9. How many hours do you typically spend pursuing activities at other N. Puget Sound locations?
Activity: _____ Location: _____ # of Hours: _____
Activity: _____ Location: _____ # of Hours: _____
Activity: _____ Location: _____ # of Hours: _____

10. What months of the year and how many days per month do you typically engage in these activities at this and all other N. Puget Sound locations?
Activity: _____ Months of Year: _____ # Days per month: _____
Activity: _____ Months of Year: _____ # Days per month: _____
Activity: _____ Months of Year: _____ # Days per month: _____

THANK YOU FOR YOUR TIME!!!!

ACTIVITY COUNT SURVEY

Surveyor Name: _____ Form #: ACS - _____

Survey Location: _____ Survey Date: _____ Start Time: _____

Weather Conditions: (check all that apply) End Time: _____

Clear	[ ]	Foggy	[ ]	Calm Wind	[ ]	Other Conditions:	_____
Cloudy	[ ]	Light Rain	[ ]	Breezy	[ ]		_____
Overcast	[ ]	Heavy Rain	[ ]	Windy	[ ]		_____

Activity Count

Activity	Number Participating		
Sand/Sediment Activities:	Child	Adolescent	Adult
Sitting on beach			
Walking/Hiking on beach			
Running on beach			
Picnicking/BBQ on beach			
Digging in the sand (away from water)			
Other:			
Water Contact Activities:			
Swimming (full body)			
Wading (legs only)			
Scuba Diving			
Surfing (wind or other)			
Digging in the sand (near or in water)			
Other:			
Minimal or Non-Water Contact Activities:			
Boating # Boats =			
Sailboating # Boats =			
Kayaking # Boats =			
Canoeing # Boats =			
Other:			
Fishing Activities:			
Fishing from boat			
Fishing from shore/pier/surf			
Harvesting shellfish			
Harvesting algae			
Other:			
Additional Activities:			

Other Comments: _____

Appendix B

SPSS Output

Appendix B: SPSS Output

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List of Tables

1.0 METHODS

This attachment provides a summary of the statistical methods and results of the Human Use Survey data analysis. Hypothesis testing was completed using SPSS V11.0 for Windows®. Significant differences for several variables were examined by location, age group, gender and ethnicity. Levene's test was used to test for homogeneity of variance among the variables. If the Levene's test was not significant, then the distributions were considered normal and one-way Analysis of Variance (ANOVA) was used to determine whether means differed significantly. If the Levene's test was significant, then the distributions were considered non-normal and a non-parametric test (i.e., Kruskal-Wallis) was conducted to evaluate whether means differed significantly. Significance for all tests was set at $p<0.05$. If the results of the ANOVA were significant, a multiple comparison test (i.e., Tukey's test) was used to determine which location; age group or ethnic groups differed. Groups with a sample size of 1 or less were excluded from this analysis.

2.0 ANALYSIS OF THE ACTIVITY COUNT SURVEY

Hypothesis testing was conducted for the data describing the number of people observed per visit. Multiple comparison tests were performed to identify any differences between the mean number of people observed at each survey location. The SPSS output for this analysis is presented in section 2.1. Tests of the homogeneity of variance suggested that the data be not normally distributed. Analysis of variance and Kruskall-Wallace non-parametric tests confirmed that there were differences between sites ($p<0.05$). Tukey's multiple comparison tests identified significant differences among survey locations. A summary of comparisons identified with significant differences is presented in Table 1. Survey sites 2 and 7 had the highest average number of people observed, and were significantly different than survey sites with lower average numbers of people observed (i.e., sites 1, 10, 12 and 14).

Table 1. Multiple comparison tests results for number of people observed at each site

Variables[1]	Significance (Tukey's Multiple Comparison Test)
Comparison of the mean number of people observed by site:	
Golden Gardens Pier (1) vs. Golden Gardens Park (2)	0.00
Golden Gardens Pier (1) vs. Edmonds Pier (7)	0.00
Golden Gardens Park (2) vs. Carkeek Park (4)	0.05
Golden Gardens Park (2) vs. Meadowdale Park (10)	0.00
Golden Gardens Park (2) vs. Picnic Point Park (12)	0.00
Golden Gardens Park (2) vs. Mukilteo State Park South (13)	0.00
Golden Gardens Park (2) vs. Mukilteo State Park North (14)	0.00
Edmonds Pier (7) vs. Meadowdale Park (10)	0.03
Edmonds Pier (7) vs. Picnic Point Park (12)	0.04
Edmonds Pier (7) vs. Mukilteo State Park North (14)	0.00

[1] Only sites with significant differences ($p<0.05$) are shown.

2.1 SPSS Output for the Activity Count Survey

Table 2. Descriptive statistics for the mean number of people observed at each survey location (Activity Count Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
1	53	5.42	7.49	1.03	3.35	7.48	0	40
2	45	35.98	58.09	8.66	18.53	53.43	0	350
4	50	17.30	32.09	4.54	8.18	26.42	0	204
5	38	22.87	27.85	4.52	13.71	32.02	0	143
6	49	20.29	27.07	3.87	12.51	28.06	0	104
7	41	29.46	27.75	4.33	20.71	38.22	0	111
8	45	19.31	27.71	4.13	10.99	27.64	0	157
10	43	8.79	13.80	2.10	4.54	13.04	0	59
12	51	10.25	14.03	1.965	6.31	14.20	0	58
13	54	20.15	27.74	3.78	12.58	27.72	0	115
14	46	5.39	6.18	0.91	3.55	7.23	0	33
Total	515	17.37	29.07	1.28	14.86	19.89	0	350

Table 3. Test of homogeneity of variances (Activity Count Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
9.17	10	504	0.00

Table 4. ANOVA (Activity Count Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	43651.57	10	4365.16	5.632	0.00
Within groups	390645.10	504	775.09		
Total	434296.70	514			

Table 5. Kruskall-Wallace non-parametric tests (Activity Count Survey)

Site	N	Mean Rank
1	53	180.29
2	45	315.04
4	50	250.78
5	38	320.59
6	49	275.30
7	41	343.46
8	45	289.28
10	43	206.49
12	51	223.64
13	54	275.13
14	46	188.82
Total	515	
Kruskall-Wallace Test		
Chi-square = 63.05	Degrees of freedom = 10	Significance = 0.00

Table 6. Tukey's multiple comparison tests (Activity Count Survey)

Site (I)	Site (J)	Mean Difference (I-J)	Std. Error	Significance	Lower 95% Confidence Interval	Upper 95% Confidence Interval
1	2	-30.56	5.643	**0.000**	-48.81	-12.31
	4	-11.88	5.489	0.531	-29.63	5.86
	5	-17.45	5.918	0.111	-36.59	1.68
	6	-14.87	5.517	0.205	-32.71	2.97
	7	-24.05	5.790	**0.002**	-42.77	-5.32
	8	-13.90	5.643	0.330	-32.14	4.35
	10	-3.38	5.714	1.000	-21.85	15.10
	12	-4.84	5.461	0.998	-22.50	12.82
	13	-14.73	5.383	0.187	-32.14	2.67
	14	.02	5.610	1.000	-18.12	18.16
2	1	30.56	5.643	**0.000**	12.31	48.81
	4	18.68	5.721	**0.045**	.18	37.18
	5	13.11	6.134	0.551	-6.72	32.94
	6	15.69	5.748	0.190	-2.90	34.28
	7	6.51	6.011	0.992	-12.92	25.95
	8	16.67	5.869	0.146	-2.31	35.65
	10	27.19	5.937	**0.000**	7.99	46.39
	12	25.72	5.694	**0.000**	7.31	44.14
	13	15.83	5.619	0.155	-2.34	34.00
	14	30.59	5.837	**0.000**	11.71	49.46
4	1	11.88	5.489	0.531	-5.86	29.63
	2	-18.68	5.721	**0.045**	-37.18	-.18
	5	-5.57	5.992	0.998	-24.94	13.81
	6	-2.99	5.596	1.000	-21.08	15.11
	7	-12.16	5.866	0.597	-31.13	6.80
	8	-2.01	5.721	1.000	-20.51	16.49
	10	8.51	5.790	0.929	-10.21	27.23
	12	7.05	5.541	0.973	-10.87	24.96
	13	-2.85	5.464	1.000	-20.52	14.82
	14	11.91	5.688	0.582	-6.48	30.30
5	1	17.45	5.918	0.111	-1.68	36.59
	2	-13.11	6.134	0.551	-32.94	6.72
	4	5.57	5.992	0.998	-13.81	24.94
	6	2.58	6.018	1.000	-16.88	22.04
	7	-6.59	6.269	0.994	-26.87	13.68
	8	3.56	6.134	10.000	-16.28	23.39
	10	14.08	6.199	0.456	-5.97	34.12
	12	12.61	5.966	0.568	-6.68	31.91
	13	2.72	5.895	1.000	-16.34	21.78
	14	17.48	6.103	0.138	-2.26	37.21
6	1	14.87	5.517	0.205	-2.97	32.71
	2	-15.69	5.748	0.190	-34.28	2.90
	4	2.99	5.596	1.000	-15.11	21.08
	5	-2.58	6.018	1.000	-22.04	16.88
	7	-9.18	5.893	0.899	-28.23	9.88
	8	.97	5.748	1.000	-17.61	19.56
	10	11.50	5.818	0.666	-7.32	30.31
	12	10.03	5.569	0.779	-7.98	28.04
	13	.14	5.493	1.000	-17.62	17.90
	14	14.89	5.716	0.248	-3.59	33.38

Site (I)	Site (J)	Mean Difference (I-J)	Std. Error	Significance	Lower 95% Confidence Interval	Upper 95% Confidence Interval
7	1	24.05	5.790	**0.002**	5.32	42.77
	2	-6.51	6.011	0.992	-25.95	12.92
	4	12.16	5.866	0.597	-6.80	31.13
	5	6.59	6.269	0.994	-13.68	26.87
	6	9.18	5.893	0.899	-9.88	28.23
	8	10.15	6.011	0.841	-9.28	29.59
	10	20.67	6.077	**0.030**	1.02	40.32
	12	19.21	5.840	**0.042**	.33	38.09
	13	9.32	5.767	0.875	-9.33	27.96
	14	24.07	5.979	**0.003**	4.74	43.41
8	1	13.90	5.643	0.330	-4.35	32.14
	2	-16.67	5.869	0.146	-35.65	2.31
	4	2.01	5.721	1.000	-16.49	20.51
	5	-3.56	6.134	1.000	-23.39	16.28
	6	-.97	5.748	1.000	-19.56	17.61
	7	-10.15	6.011	0.841	-29.59	9.28
	10	10.52	5.937	0.796	-8.68	29.72
	12	9.06	5.694	0.886	-9.36	27.47
	13	-.84	5.619	1.000	-19.01	17.33
	14	13.92	5.837	0.379	-4.96	32.80
10	1	3.38	5.714	1.000	-15.10	21.85
	2	-27.19	5.937	**0.000**	-46.39	-7.99
	4	-8.51	5.790	0.929	-27.23	10.21
	5	-14.08	6.199	0.456	-34.12	5.97
	6	-11.50	5.818	0.666	-30.31	7.32
	7	-20.67	6.077	**0.030**	-40.32	-1.02
	8	-10.52	5.937	0.796	-29.72	8.68
	12	-1.46	5.764	1.000	-20.10	17.17
	13	-11.36	5.690	0.652	-29.76	7.04
	14	3.40	5.906	1.000	-15.70	22.50
12	1	4.84	5.461	0.998	-12.82	22.50
	2	-25.72	5.694	**0.000**	-44.14	-7.31
	4	-7.05	5.541	0.973	-24.96	10.87
	5	-12.61	5.966	0.568	-31.91	6.68
	6	-10.03	5.569	0.779	-28.04	7.98
	7	-19.21	5.840	**0.042**	-38.09	-.33
	8	-9.06	5.694	0.886	-27.47	9.36
	10	1.46	5.764	1.000	-17.17	20.10
	13	-9.89	5.436	0.768	-27.47	7.68
	14	4.86	5.661	0.999	-13.44	23.17
13	1	14.73	5.383	0.187	-2.67	32.14
	2	-15.83	5.619	0.155	-34.00	2.34
	4	2.85	5.464	1.000	-14.82	20.52
	5	-2.72	5.895	1.000	-21.78	16.34
	6	-.14	5.493	1.000	-17.90	17.62
	7	-9.32	5.767	0.875	-27.96	9.33
	8	.84	5.619	1.000	-17.33	19.01
	10	11.36	5.690	0.652	-7.04	29.76
	12	9.89	5.436	0.768	-7.68	27.47
	14	14.76	5.586	0.230	-3.31	32.82
14	1	-.02	5.610	1.000	-18.16	18.12

Site (I)	Site (J)	Mean Difference (I-J)	Std. Error	Significance	Lower 95% Confidence Interval	Upper 95% Confidence Interval
	2	-30.59	5.837	**0.000**	-49.46	-11.71
	4	-11.91	5.688	0.582	-30.30	6.48
	5	-17.48	6.103	0.138	-37.21	2.26
	6	-14.89	5.716	0.248	-33.38	3.59
	7	-24.07	5.979	**0.003**	-43.41	-4.74
	8	-13.92	5.837	0.379	-32.80	4.96
	10	-3.40	5.906	1.000	-22.50	15.70
	12	-4.86	5.661	0.999	-23.17	13.44
	13	-14.76	5.586	0.230	-32.82	3.31

3.0 ANALYSIS OF THE SHORELINE USE SURVEY

Hypothesis testing was conducted for the ten activities identified with the highest use during the Shoreline Use Survey. These activities included: walking, sitting/reading, digging in sand (in/near water), picnicking/barbecuing/sitting by fire, sunbathing, digging in sand (away from water), fishing, running, wading, and scuba diving. Location, age, gender and ethnicity performed comparisons of the mean number of hours engaged in each activity. The statistical methods used in this analysis are identical as those previously described (Section 1.0). The SPSS output for each activity is presented in sections (3.1-3.10).

The results for comparisons that were significantly different ($p<0.05$) are presented in Table 7. In summary, location differences were observed for picnicking activities (i.e., picnicking, barbecuing, and siting by fire). Differences in age groups were identified in some cases for walking, sitting/reading, and running. The number of hours engaged in digging in sand (away from water) and fishing was also found to be significantly different for some ethnic groups. No other activities or variables were found to have significant differences.

Table 7. Multiple comparison tests results for number of hours engaged in an activity

Variables	Significance (Tukey's Multiple Comparison Test)
Walking: Number of hours per visit by age	
≤ 10 vs. 21-30	0.00
≤ 10 vs. 41-50	0.01
≤ 10 vs. 51-60	0.01
≤ 10 vs. >70	0.03
Sitting/Reading: Number of hours per visit by age	
21-30 vs. 31-40	0.03
Picnicking/Barbecuing/Sitting by Fire: Number of hours per visit by site	
Carkeek Park (4) vs. Richmond Beach Park (5)	0.04
Carkeek Park (4) vs. Edmonds (6, 7, 8)	0.01
Digging in Sand (Away from water): Number of hours per visit by ethnicity	
Caucasian vs. Asian	0.04
Fishing: Number of hours per visit by ethnicity	
Caucasian vs. Hispanic	0.04
Running: Number of hours per visit by age	
≤ 10 vs. 31-40	0.03
≤ 10 vs. 41-50	0.01

3.1 SPSS Output for Analysis of Walking

3.1.1 Number of hours walking by location

Table 8. Descriptive statistics for walking by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	79	1.06	0.60	0.07	0.93	1.19	0.20	3
4	60	1.15	0.60	0.08	0.99	1.30	0.25	2.50
5	61	1.09	0.80	0.10	0.88	1.29	0.25	6
6	120	1.04	0.62	0.06	0.93	1.15	0.08	4
10	42	1.23	0.46	0.07	1.08	1.37	0.45	2
12	68	1.10	0.65	0.08	0.94	1.25	0.13	3
13	75	1.15	0.64	0.07	0.99	1.29	0.20	4
Total	505	1.10	0.63	0.03	1.05	1.16	0.08	6

Table 9. Test of homogeneity of variances for walking by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.30	6	498	0.94

Table 10. ANOVA for walking by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	1.52	6	0.25	0.63	0.71
Within groups	199.89	498	0.40		
Total	201.41	504			

3.1.2 Number of hours walking by age group

Table 11. Descriptive statistics for walking by age group (Shoreline Use Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
≤ 10	20	0.61	0.42	0.09	0.41	0.81	0.17	2
11-20	46	1.00	0.51	0.08	0.85	1.15	0.17	2
21-30	92	1.19	0.60	0.06	1.07	1.32	0.13	3
31-40	133	1.05	0.60	0.05	0.95	1.16	0.20	3
41-50	81	1.15	0.65	0.07	1.01	1.30	0.20	4
51-60	64	1.18	0.87	0.11	0.97	1.40	0.08	6
61-70	39	1.07	0.45	0.07	0.93	1.22	0.17	2
> 70	20	1.24	0.61	0.14	0.96	1.53	0.33	2.50
Total	495	1.10	0.64	0.03	1.04	1.15	0.08	6.0

Table 12. Test of homogeneity of variances for walking by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.96	7	487	0.06

Table 13. ANOVA for walking by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	7.42	7	1.06	2.69	0.01
Within groups	191.79	487	0.39		
Total	199.21	494			

Table 14. Tukey's multiple comparison tests for walking by age group (Shoreline Use Survey)

Age (I)	Age (J)	Mean Difference (I-J)	Std. Error	Significance	Lower 95% Confidence Interval	Upper 95% Confidence Interval
<=10	11-20	-.394746	.1680833	.270	-.906418	.116925
	21-30	-.584601	.1548270	**.004**	-1.055919	-.113284
	31-40	-.444680	.1505052	.064	-.902842	.013481
	41-50	-.543313	.1566931	**.013**	-1.020311	-.066315
	51-60	-.573307	.1607612	**.009**	-1.062689	-.083925
	61-70	-.466453	.1725938	.124	-.991855	.058949
	>70	-.633333	.1984479	**.032**	-1.237440	-.029227
11-20	<=10	.394746	.1680833	.270	-.116925	.906418
	21-30	-.189855	.1133218	.703	-.534824	.155114
	31-40	-.049934	.1073417	1.000	-.376699	.276831
	41-50	-.148566	.1158583	.905	-.501257	.204124
	51-60	-.178561	.1213037	.822	-.547828	.190706
	61-70	-.071707	.1365982	1.000	-.487533	.344119
	>70	-.238587	.1680833	.848	-.750259	.273085
21-30	<=10	.584601	.1548270	**.004**	.113284	1.055919
	11-20	.189855	.1133218	.703	-.155114	.534824
	31-40	.139921	.0850978	.723	-.119130	.398972
	41-50	.041289	.0956166	1.000	-.249783	.332360
	51-60	.011294	.1021468	1.000	-.299657	.322245
	61-70	.118148	.1199102	.976	-.246877	.483174
	>70	-.048732	.1548270	1.000	-.520049	.422585
31-40	<=10	.444680	.1505052	.064	-.013481	.902842
	11-20	.049934	.1073417	1.000	-.276831	.376699
	21-30	-.139921	.0850978	.723	-.398972	.119130
	41-50	-.098632	.0884474	.953	-.367880	.170615
	51-60	-.128627	.0954693	.880	-.419250	.161997
	61-70	-.021773	.1142754	1.000	-.369644	.326099
	>70	-.188653	.1505052	.915	-.646814	.269508
41-50	<=10	.543313	.1566931	**.013**	.066315	1.020311
	11-20	.148566	.1158583	.905	-.204124	.501257
	21-30	-.041289	.0956166	1.000	-.332360	.249783
	31-40	.098632	.0884474	.953	-.170615	.367880
	51-60	-.029995	.1049538	1.000	-.349490	.289501
	61-70	.076860	.1223101	.998	-.295471	.449191
	>70	-.090021	.1566931	.999	-.567018	.386977
51-60	<=10	.573307	.1607612	**.009**	.083925	1.062689

Age (I)	Age (J)	Mean Difference (I-J)	Std. Error	Significance	Lower 95% Confidence Interval	Upper 95% Confidence Interval
	11-20	.178561	.1213037	.822	-.190706	.547828
	21-30	-.011294	.1021468	1.000	-.322245	.299657
	31-40	.128627	.0954693	.880	-.161997	.419250
	41-50	.029995	.1049538	1.000	-.289501	.349490
	61-70	.106854	.1274802	.991	-.281215	.494924
	>70	-.060026	.1607612	1.000	-.549408	.429356
61-70	<=10	.466453	.1725938	.124	-.058949	.991855
	11-20	.071707	.1365982	1.000	-.344119	.487533
	21-30	-.118148	.1199102	.976	-.483174	.246877
	31-40	.021773	.1142754	1.000	-.326099	.369644
	41-50	-.076860	.1223101	.998	-.449191	.295471
	51-60	-.106854	.1274802	.991	-.494924	.281215
	>70	-.166880	.1725938	.979	-.692283	.358522
>70	<=10	.633333	.1984479	**.032**	.029227	1.237440
	11-20	.238587	.1680833	.848	-.273085	.750259
	21-30	.048732	.1548270	1.000	-.422585	.520049
	31-40	.188653	.1505052	.915	-.269508	.646814
	41-50	.090021	.1566931	.999	-.386977	.567018
	51-60	.060026	.1607612	1.000	-.429356	.549408
	61-70	.166880	.1725938	.979	-.358522	.692283

3.1.3 Number of hours walking by gender

Table 15. Descriptive statistics for walking by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	258	1.12	0.67	0.04	1.03	1.20	0.13	6
Female	243	1.07	0.57	0.04	1.00	1.14	0.08	4
Total	501	1.09	0.63	0.03	1.04	1.15	0.08	6

Table 16. Test of homogeneity of variances for walking by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
2.42	1	499	0.12

Table 17. ANOVA for walking by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.25	1	0.25	0.64	0.42
Within groups	195.33	499	0.39		
Total	195.58	500			

3.1.4 Number of hours walking by ethnic group

Table 18. Descriptive statistics for walking by ethnicity (Shoreline Use Survey)

Ethnic Group	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	437	1.09	0.62	0.03	1.03	1.15	0.08	6
African American	10	1.40	0.74	0.23	0.87	1.93	0.50	3
Asian	32	1.14	0.57	0.10	0.93	1.35	0.30	2.50
Hispanic	9	1.11	1.24	0.41	0.16	2.06	0.25	4
Other	17	1.14	0.58	0.14	0.84	1.44	0.25	2
Total	505	1.10	0.63	0.03	1.05	1.16	0.08	6

Table 19. Test of homogeneity of variances for walking by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
2.99	4	500	0.02

Table 20. ANOVA for walking by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	1.04	4	0.26	0.65	0.63
Within groups	200.37	500	0.40		
Total	201.41	504			

3.2 SPSS Output for Analysis of Sitting/Reading

3.2.1 Number of hours sitting/reading by location

Table 21. Descriptive statistics for sitting/reading by location (Shoreline Use Survey)

Location	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	44	1.59	0.76	0.12	1.36	1.82	0.33	4
4	20	1.69	1.01	0.22	1.22	2.16	0.25	3.50
5	31	1.42	0.67	0.12	1.17	1.66	0.25	2.50
6	71	1.41	1.02	0.12	1.16	1.65	0.17	6
10	19	1.20	0.64	0.15	0.89	1.51	0.50	3
12	30	1.64	1.03	0.19	1.26	2.03	0.50	4.50
13	46	1.33	1.16	0.17	0.98	1.67	0.50	7
Total	261	1.46	0.95	0.06	1.34	1.57	0.17	7

Table 22. Test of homogeneity of variances for sitting/reading by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.29	6	254	0.263

Table 23. ANOVA for sitting/reading by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	5.19	6	0.87	0.96	0.46
Within groups	229.64	254	0.90		
Total	238.83	260			

3.2.2 Number of hours sitting/reading by age group

Table 24. Descriptive statistics for sitting/reading by age (Shoreline Use Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
≤ 10	4	0.88	0.25	0.13	0.48	1.27	0.50	1
11-20	38	1.59	0.81	0.13	1.32	1.85	0.25	3.50
21-30	46	1.78	1.00	0.15	1.48	2.07	0.50	4.50
31-40	79	1.23	0.70	0.08	1.07	1.39	0.17	3
41-50	44	1.35	1.02	0.15	1.05	1.66	0.25	6
51-60	21	1.27	0.73	0.16	0.94	1.60	0.25	3
61-70	21	1.68	1.53	0.33	0.98	2.37	0.25	7
> 70	3	1.67	0.58	0.33	0.23	3.10	1.00	2
Total	256	1.44	0.93	0.06	1.33	1.56	0.17	7

Table 25. Test of homogeneity of variances for sitting/reading by age (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
2.16	7	248	0.39

Table 26. ANOVA for sitting/reading by age (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	13.08	7	1.87	2.21	0.03
Within groups	209.84	248	0.85		
Total	222.92	255			

Table 27. Kruskall-Wallace non-parametric tests for sitting/reading by age (Shoreline Use Survey)

Site	N	Mean Rank
≤ 10	4	81.88
11-20	38	146.22
21-30	46	155.39
31-40	79	114.23
41-50	44	117.31
51-60	21	118.00
61-70	21	128.93
> 70	3	164.17
Total	256	
Kruskall-Wallace Test		
Chi-square = 15.75	Degrees of freedom = 7	Significance = 0.03

Table 28. Tukey's multiple comparison tests for sitting/reading by age (Shoreline Use Survey)

(I) AGE	(J) AGE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
<=10	11-20	-.71053	.483525	.823	-2.18866	.76761
	21-30	-.90217	.479504	.565	-2.36802	.56367
	31-40	-.35565	.471424	.995	-1.79680	1.08549
	41-50	-.47917	.480375	.974	-1.94767	.98934
	51-60	-.39087	.501818	.994	-1.92493	1.14319
	61-70	-.80357	.501818	.749	-2.33763	.73049
	>70	-.79167	.702546	.950	-2.93935	1.35602
11-20	<=10	.71053	.483525	.823	-.76761	2.18866
	21-30	-.19165	.201644	.981	-.80807	.42478
	31-40	.35487	.181595	.515	-.20026	.91001
	41-50	.23136	.203707	.948	-.39137	.85409
	51-60	.31965	.250116	.906	-.44495	1.08426
	61-70	-.09305	.250116	1.000	-.85765	.67156
	>70	-.08114	.551640	1.000	-1.76751	1.60522
21-30	<=10	.90217	.479504	.565	-.56367	2.36802
	11-20	.19165	.201644	.981	-.42478	.80807
	31-40	.54652	.170600	**.033**	.02500	1.06804
	41-50	.42301	.193969	.367	-.16996	1.01597
	51-60	.51130	.242251	.411	-.22926	1.25186
	61-70	.09860	.242251	1.000	-.64196	.83916
	>70	.11051	.548119	1.000	-1.56509	1.78611
31-40	<=10	.35565	.471424	.995	-1.08549	1.79680
	11-20	-.35487	.181595	.515	-.91001	.20026
	21-30	-.54652	.170600	**.033**	-1.06804	-.02500
	41-50	-.12351	.173033	.997	-.65247	.40545
	51-60	-.03522	.225836	1.000	-.72560	.65516
	61-70	-.44792	.225836	.495	-1.13830	.24246
	>70	-.43601	.541064	.993	-2.09005	1.21802
41-50	<=10	.47917	.480375	.974	-.98934	1.94767
	11-20	-.23136	.203707	.948	-.85409	.39137
	21-30	-.42301	.193969	.367	-1.01597	.16996
	31-40	.12351	.173033	.997	-.40545	.65247
	51-60	.08829	.243970	1.000	-.65752	.83411

(I) AGE	(J) AGE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
	61-70	-.32440	.243970	.887	-1.07022	.42141
	>70	-.31250	.548881	.999	-1.99043	1.36543
51-60	<=10	.39087	.501818	.994	-1.14319	1.92493
	11-20	-.31965	.250116	.906	-1.08426	.44495
	21-30	-.51130	.242251	.411	-1.25186	.22926
	31-40	.03522	.225836	1.000	-.65516	.72560
	41-50	-.08829	.243970	1.000	-.83411	.65752
	61-70	-.41270	.283871	.831	-1.28049	.45510
	>70	-.40079	.567743	.997	-2.13638	1.33480
61-70	<=10	.80357	.501818	.749	-.73049	2.33763
	11-20	.09305	.250116	1.000	-.67156	.85765
	21-30	-.09860	.242251	1.000	-.83916	.64196
	31-40	.44792	.225836	.495	-.24246	1.13830
	41-50	.32440	.243970	.887	-.42141	1.07022
	51-60	.41270	.283871	.831	-.45510	1.28049
	>70	.01190	.567743	1.000	-1.72369	1.74750
>70	<=10	.79167	.702546	.950	-1.35602	2.93935
	11-20	.08114	.551640	1.000	-1.60522	1.76751
	21-30	-.11051	.548119	1.000	-1.78611	1.56509
	31-40	.43601	.541064	.993	-1.21802	2.09005
	41-50	.31250	.548881	.999	-1.36543	1.99043
	51-60	.40079	.567743	.997	-1.33480	2.13638
	61-70	-.01190	.567743	1.000	-1.74750	1.72369

3.2.3 Number of hours sitting/reading by gender

Table 29. Descriptive statistics for sitting/reading by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	99	1.35	0.83	0.08	1.18	1.51	0.17	4
Female	160	1.53	1.01	0.08	1.37	1.69	0.25	7
Total	259	1.46	0.95	0.06	1.34	1.58	0.17	7

Table 30. Test of homogeneity of variances for sitting/reading by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.59	1	257	0.44

Table 31. ANOVA for sitting/reading by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	2.08	1	2.08	2.31	0.13
Within groups	231.19	257	0.90		
Total	233.27	258			

3.2.4 Number of hours sitting/reading by ethnic group

Table 32. Descriptive statistics for sitting/reading by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	224	1.43	0.95	0.06	1.31	1.56	0.17	7
African American	5	0.90	0.65	0.29	0.09	1.71	0.50	2
Asian	23	1.74	0.88	0.18	1.36	2.12	0.50	4
Hispanic	2	2.88	0.88	0.63	-5.08	10.82	2.25	3.50
Other	7	1.31	0.93	0.35	0.45	2.17	0.50	3
Total	261	1.46	0.95	0.06	1.34	1.57	0.17	7

Table 33. Test of homogeneity of variances for sitting/reading by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.21	4	256	0.93

Table 34. ANOVA for sitting/reading by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	7.67	4	1.92	2.16	0.07
Within groups	227.16	256	0.89		
Total	234.83	260			

3.3 SPSS Output for Analysis of Digging in Sand (In/Near Water)

3.3.1 Number of hours digging in sand (in/near water) by location

Table 35. Descriptive statistics for digging in sand (in/near) by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	25	1.03	0.61	0.12	0.78	1.28	0.25	2.50
4	19	1.11	0.86	0.20	0.69	1.52	0.20	3
5	8	0.91	0.71	0.25	0.32	1.50	0.25	2.50
6	41	1.01	0.71	0.11	0.79	1.24	0.08	3
10	3	1.20	0.61	0.35	-0.31	2.71	0.50	1.60
12	14	1.52	0.54	0.14	1.22	1.83	0.50	2
13	23	1.41	0.78	0.16	1.08	1.75	0.50	3.50
Total	133	1.15	0.72	0.06	1.03	1.28	0.08	3.50

Table 36. Test of homogeneity of variances for digging in sand (in/near) by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.30	6	126	0.26

Table 37. ANOVA for digging in sand (in/near) by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	5.17	6	0.86	1.71	0.13
Within groups	63.62	126	0.51		
Total	68.79	132			

3.3.2 Number of hours digging in sand (in/near water) by age group

Table 38. Descriptive statistics for digging in sand (in/near) by age group (Shoreline Use Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
≤ 10	59	1.08	0.81	0.11	0.87	1.29	0.08	3.50
11-20	10	1.33	0.50	0.16	0.97	1.68	0.75	2
21-30	18	1.07	0.51	0.12	0.82	1.32	0.25	2
31-40	31	1.11	0.69	0.12	0.85	1.36	0.17	2.50
41-50	11	1.68	0.68	0.21	1.22	2.14	1.00	3
61-70	2	1.00	0.00	0.00	1.00	1.00	1.00	1
>70	2	1.13	1.24	0.88	-9.99	12.24	0.25	2
Total	133	1.15	0.72	0.06	1.03	1.28	0.08	3.50

Table 39. Test of homogeneity of variances for digging in sand (in/near) by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.67	6	126	0.13

Table 40. ANOVA for digging in sand (in/near) by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	3.95	6	0.66	1.28	0.27
Within groups	64.84	126	0.52		
Total	68.79	132			

3.3.3 Number of hours digging in sand (in/near water) by gender

Table 41. Descriptive statistics for digging in sand (in/near) by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	68	1.16	0.77	0.09	0.97	1.34	0.08	3.50
Female	64	1.16	0.67	0.08	0.99	1.33	0.08	3
Total	132	1.16	0.72	0.06	1.03	1.28	0.08	3.50

Table 42. Test of homogeneity of variances for digging in sand (in/near) by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.47	1	130	0.50

Table 43. ANOVA for digging in sand (in/near) by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.00	1	0.00	0.00	0.99
Within groups	67.81	130	0.52		
Total	67.81	131			

3.3.4 Number of hours digging in sand (in/near water) by ethnic group

Table 44. Descriptive statistics for digging in sand (in/near) by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	115	1.22	0.73	0.07	1.08	1.35	0.08	3.50
African American	3	0.83	0.14	0.08	0.47	1.19	0.75	1
Asian	7	0.79	0.74	0.28	0.10	1.47	0.17	2
Hispanic	2	0.25	0.00	0.00	0.25	0.25	0.25	0.25
Other	6	0.75	0.39	0.16	0.34	1.16	0.25	1
Total	133	1.15	0.72	0.06	1.03	1.28	0.08	3.50

Table 45. Test of homogeneity of variances for digging in sand (in/near) by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
2.73	4	128	0.03

Table 46. ANOVA for digging in sand (in/near) by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	4.35	4	1.09	2.16	0.08
Within groups	64.44	128	0.50		
Total	68.79	132			

Table 47. Kruskall-Wallace non-parametric tests for digging in sand (in/near) by ethnicity (Shoreline Use Survey)

Site	N	Mean Rank
Caucasian	115	70.69
African American	3	48.50
Asian	7	45.14
Hispanic	2	11.50
Other	6	49.50
Total	133	
Kruskall-Wallace Test		
Chi-square = 9.79	Degrees of freedom = 4	Significance = 0.04

Table 48. Tukey's multiple comparison tests for digging in sand (in/near) by ethnicity (Shoreline Use Survey)

(I) Ethnicity	(J) Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Caucasian	African Am.	.385036	.4149637	.886	-.763188	1.533261
	Asian	.432655	.2762235	.522	-.331668	1.196979
	Hispanic	.968370	.5060665	.315	-.431941	2.368680
	Other	.468370	.2971302	.515	-.353804	1.290543
African Am.	Caucasian	-.385036	.4149637	.886	-1.533261	.763188
	Asian	.047619	.4896311	1.000	-1.307214	1.402452
	Hispanic	.583333	.6477210	.896	-1.208942	2.375609
	Other	.083333	.5017225	1.000	-1.304957	1.471624
Asian	Caucasian	-.432655	.2762235	.522	-1.196979	.331668
	African Am.	-.047619	.4896311	1.000	-1.402452	1.307214
	Hispanic	.535714	.5688999	.880	-1.038459	2.109888
	Other	.035714	.3947532	1.000	-1.056587	1.128016
Hispanic	Caucasian	-.968370	.5060665	.315	-2.368680	.431941
	African Am	-.583333	.6477210	.896	-2.375609	1.208942
	Asian	-.535714	.5688999	.880	-2.109888	1.038459
	Other	-.500000	.5793393	.910	-2.103060	1.103060
Other	Caucasian	-.468370	.2971302	.515	-1.290543	.353804
	African Am	-.083333	.5017225	1.000	-1.471624	1.304957
	Asian	-.035714	.3947532	1.000	-1.128016	1.056587
	Hispanic	.500000	.5793393	.910	-1.103060	2.103060

3.4 SPSS Output for Analysis of Picnicking/Barbecuing/Sitting By Fire

3.4.1 Number of hours picnicking/barbecuing/Sitting by fire by location

Table 49. Descriptive statistics for picnicking by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	22	2.68	2.02	0.43	1.79	3.58	0.50	8
4	15	3.70	2.38	0.61	2.38	5.02	1.00	8
5	13	1.77	1.58	0.44	0.82	2.72	0.50	5.50
6	12	1.38	0.92	0.26	0.80	1.97	0.30	3
10	6	3.33	2.36	0.96	0.86	5.81	1.50	8
12	19	2.20	1.09	0.25	1.68	2.73	1.00	4
13	26	2.55	1.24	0.24	2.05	3.05	0.30	5
Total	113	2.50	1.75	0.16	2.17	2.82	0.30	8

Table 50. Test of homogeneity of variances for picnicking by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.96	6	106	0.08

Table 51. ANOVA for picnicking by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	50.20	6	8.37	3.04	0.01
Within groups	291.99	106	2.76		
Total	342.19	112			

Table 52. Tukey's multiple comparisons for picnicking by location (Shoreline Use Survey)

(I) Site	(J) Site	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
2	4	-1.018	.5557	.530	-2.689	.652
	5	.913	.5806	.700	-.833	2.658
	6	1.300	.5956	.314	-.490	3.090
	10	-.652	.7644	.979	-2.949	1.646
	12	.480	.5198	.968	-1.082	2.042
	13	.131	.4808	1.000	-1.315	1.576
4	2	1.018	.5557	.530	-.652	2.689
	5	1.931	.6289	**.042**	.040	3.821
	6	2.318	.6428	**.008**	.386	4.250
	10	.367	.8017	.999	-2.043	2.776
	12	1.498	.5733	.132	-.225	3.221
	13	1.149	.5381	.340	-.469	2.766
5	2	-.913	.5806	.700	-2.658	.833
	4	-1.931	.6289	**.042**	-3.821	-.040
	6	.387	.6644	.997	-1.610	2.384
	10	-1.564	.8191	.479	-4.026	.898
	12	-.433	.5974	.991	-2.228	1.363
	13	-.782	.5638	.807	-2.477	.913
6	2	-1.300	.5956	.314	-3.090	.490
	4	-2.318	.6428	**.008**	-4.250	-.386
	5	-.387	.6644	.997	-2.384	1.610
	10	-1.951	.8299	.230	-4.446	.543
	12	-.820	.6120	.832	-2.659	1.020
	13	-1.169	.5792	.409	-2.910	.572
10	2	.652	.7644	.979	-1.646	2.949
	4	-.367	.8017	.999	-2.776	2.043
	5	1.564	.8191	.479	-.898	4.026
	6	1.951	.8299	.230	-.543	4.446
	12	1.132	.7772	.770	-1.205	3.468
	13	.782	.7517	.943	-1.477	3.041
12	2	-.480	.5198	.968	-2.042	1.082
	4	-1.498	.5733	.132	-3.221	.225
	5	.433	.5974	.991	-1.363	2.228
	6	.820	.6120	.832	-1.020	2.659
	10	-1.132	.7772	.770	-3.468	1.205
	13	-.350	.5009	.992	-1.855	1.156

(I) Site	(J) Site	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
13	2	-.131	.4808	1.000	-1.576	1.315
	4	-1.149	.5381	.340	-2.766	.469
	5	.782	.5638	.807	-.913	2.477
	6	1.169	.5792	.409	-.572	2.910
	10	-.782	.7517	.943	-3.041	1.477
	12	.350	.5009	.992	-1.156	1.855

3.4.2 Number of hours picnicking/barbecuing/sitting by fire by age group

Table 53. Descriptive statistics for picnicking by age group (Shoreline Use Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
≤ 10	5	2.10	1.47	0.66	0.27	3.93	0.50	3.50
11-20	22	3.60	2.48	0.53	2.50	4.70	0.30	8
21-30	23	2.31	1.41	0.29	1.70	2.92	0.30	5
31-40	34	2.00	1.01	0.17	1.65	2.35	0.50	5
41-50	16	2.44	1.73	0.43	1.52	3.36	0.50	8
61-70	8	2.04	1.32	0.47	0.94	3.15	0.30	4.50
>70	3	2.00	0.00	0.00	2.00	2.00	2.00	2
Total	111	2.45	1.68	0.16	2.14	2.77	0.30	8

Table 54. Test of homogeneity of variances for picnicking by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
3.61	6	104	0.00

Table 55. ANOVA for picnicking by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	39.04	6	6.51	2.48	0.03
Within groups	272.40	104	2.62		
Total	311.44	110			

Table 56. Kruskall-Wallace non-parametric tests for picnicking by age group (Shoreline Use Survey)

Site	N	Mean Rank
≤ 10	5	53.20
11-20	22	71.68
21-30	23	55.22
31-40	34	49.21
41-50	16	55.59
51-60	8	49.00
>70	3	49.50
Total	111	
Kruskall-Wallace Test		
Chi-square = 7.45	Degrees of freedom = 6	Significance = 0.28

3.4.3 Number of hours picnicking/barbecuing/sitting by fire by gender

Table 57. Descriptive statistics for picnicking by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	53	2.75	2.11	0.29	2.17	3.33	0.30	8
Female	59	2.29	1.33	0.17	194	2.64	0.30	8
Total	112	2.51	1.75	0.17	2.18	2.84	0.30	8

Table 58. Test of homogeneity of variances for picnicking by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
6.99	1	110	0.01

Table 59. ANOVA for picnicking by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	5.96	1	5.96	1.95	0.17
Within groups	335.23	110	3.05		
Total	341.18	111			

Table 60. Kruskall-Wallace non-parametric tests for picnicking by gender (Shoreline Use Survey)

Site	N	Mean Rank
Male	52	57.34
Female	59	54.82
Total	111	
Kruskall-Wallace Test		
Chi-square = 0.17	Degrees of freedom = 1	Significance = 0.68

3.4.4 Number of hours picnicking/barbecuing/sitting by fire by ethnic group

Table 61. Descriptive statistics for picnicking by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	94	2.50	1.76	0.18	2.14	2.86	0.30	8
African American	5	3.90	2.50	1.10	0.85	6.95	2	8
Asian	9	2.03	0.79	0.27	1.42	2.64	1	3.50
Hispanic	2	3.50	2.12	1.50	-15.56	22.56	2	5
Other	3	0.92	0.14	0.08	0.56	1.28	0.80	1
Total	113	2.50	1.75	0.16	2.17	2.82	0.30	8

Table 62. Test of homogeneity of variances for picnicking by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.59	4	108	0.18

Table 63. ANOVA for picnicking by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	21.33	4	5.33	1.80	0.14
Within groups	320.86	108	2.97		
Total	342.19	112			

3.5 SPSS Output for Analysis of Digging in Sand (Away from Water)

3.5.1 Number of hours digging in sand (away from water) by location

Table 64. Descriptive statistics for digging in sand (away from water) by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	15	1.07	0.65	0.17	0.71	1.43	0.50	2.50
4	11	0.69	0.47	0.14	0.37	1.01	0.30	1.80
5	12	0.77	0.35	0.10	0.55	0.99	0.10	1.30
6	30	0.84	0.52	0.10	0.64	1.04	0.10	2
10	3	1.00	0.00	0.00	1.00	1.00	1.00	1
12	3	1.00	0.87	0.50	-1.15	3.15	0.50	2
Total	74	0.87	0.53	0.06	0.74	0.99	0.10	2.50

Table 65. Test of homogeneity of variances for digging in sand (away from water) by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.48	5	68	0.21

Table 66. ANOVA for digging in sand (away from water) by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	1.19	5	0.24	0.85	0.52
Within groups	18.98	68	0.28		
Total	20.16	73			

3.5.2 Number of hours digging in sand (away from water) by Age group

Table 67. Descriptive statistics for digging in sand (away from water) by age group (Shoreline Use Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
≤ 10	39	0.79	0.46	0.07	0.64	0.93	0.10	2
11-20	5	0.83	0.27	0.12	0.49	1.17	0.40	1
21-30	9	0.92	0.56	0.19	0.49	1.35	0.30	2
31-40	11	1.09	0.66	0.20	0.65	1.53	0.20	2.50
41-50	4	1.21	0.92	0.46	-0.25	2.67	0.30	2.50
51-60	3	1.08	0.14	0.08	0.73	1.44	1	1.30
Total	71	0.89	0.52	0.06	0.77	1.01	0.10	2.50

Table 68. Test of homogeneity of variances for digging in sand (away from water) by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.47	5	65	0.21

Table 69. ANOVA for digging in sand (away from water) by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	1.41	5	0.28	1.04	0.40
Within groups	17.65	65	0.27		
Total	19.06	70			

3.5.3 Number of hours digging in sand (away from water) by gender

Table 70. Descriptive statistics for digging in sand (away from water) by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	37	0.85	0.46	0.08	0.70	1.01	0.10	2
Female	36	0.90	0.59	0.10	0.70	1.10	0.10	2.50
Total	73	0.87	0.52	0.06	0.75	1.00	0.10	2.50

Table 71. Test of homogeneity of variances for digging in sand (away from water) by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.64	1	71	0.43

Table 72. ANOVA for digging in sand (away from water) by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.04	1	0.04	0.13	0.72
Within groups	19.63	71	0.28		
Total	19.67	72			

3.5.4 Number of hours digging in sand (away from water) by ethnic group

Table 73. Descriptive statistics for digging in sand (away from water) by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	68	0.91	0.52	0.06	0.78	1.03	0.10	2.50
Asian	5	0.40	0.37	0.16	-0.05	0.85	0.20	1
Total	73	0.87	0.52	0.06	0.75	1.00	0.10	2.50

Table 74. Test of homogeneity of variances for digging in sand (away from water) by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.26	1	71	0.61

Table 75. ANOVA for digging in sand (away from water) by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups[1]	1.20	1	1.20	4.60	0.04
Within groups	18.56	71	0.26		
Total	19.78	72			

[1] ANOVA applies to differences between Caucasian and Asian groups

3.6 SPSS Output for Analysis of Sunbathing

3.6.1 Number of hours sunbathing by location

Table 76. Descriptive statistics for sunbathing by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	10	2.13	1.20	0.38	1.27	2.98	1	3.50
4	5	2.70	2.71	1.21	-0.66	6.06	1	7.50
5	6	2.42	0.68	0.28	1.70	3.13	1.75	3.50
6	12	1.75	0.89	0.26	1.18	2.32	1	3.50
10	6	1.33	1.33	0.54	-0.06	2.73	0.50	4
12	13	3.22	1.88	0.52	2.08	4.35	1	7
13	9	2.72	1.37	0.46	1.67	3.78	1	5
Total	61	2.37	1.54	0.20	1.98	2.76	0.50	7.50

Table 77. Test of homogeneity of variances for sunbathing by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
2.25	6	54	0.05

Table 78. ANOVA for sunbathing by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	22.68	6	3.78	1.71	0.14
Within groups	119.59	54	2.22		
Total	142.27	60			

3.6.2 Number of hours sunbathing by age group

Table 79. Descriptive statistics for sunbathing by age group (Shoreline Use Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
11-20	14	2.07	1.31	0.35	1.31	2.83	0.50	4
21-30	17	2.74	1.77	0.43	1.83	3.64	1	7
31-40	17	2.33	1.61	0.39	1.50	3.15	1	7.50
41-50	10	2.35	1.43	0.45	1.32	3.38	1	5
51-60	2	1.00	0.00	0.00	1.00	1.00	1	1
Total	60	2.34	1.54	0.20	1.95	2.74	0.50	7.50

Table 80. Test of homogeneity of variances for sunbathing by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.36	4	55	0.26

Table 81. ANOVA for sunbathing by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	7.26	4	1.82	0.75	0.56
Within groups	132.31	55	2.41		
Total	139.57	59			

3.6.3 Number of hours sunbathing by gender

Table 82. Descriptive statistics for sunbathing by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	21	2.49	1.56	0.34	1.78	3.20	0.50	7.50
Female	40	2.31	1.55	0.24	1.81	2.80	0.50	7
Total	61	2.37	1.54	0.20	1.98	2.76	0.50	7.50

Table 83. Test of homogeneity of variances for sunbathing by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.43	1	59	0.52

Table 84. ANOVA for sunbathing by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.48	1	0.48	0.20	0.66
Within groups	141.80	59	2.40		
Total	142.27	60			

3.6.4 Number of hours sunbathing by ethnic group

Table 85. Descriptive statistics for sunbathing by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	48	2.26	1.64	0.24	1.79	2.74	0.50	7.50
Asian	9	2.81	1.03	0.34	2.01	3.60	1	4
Hispanic	2	1.63	0.88	0.63	-6.32	9.57	1	2.25
Other	2	3.75	0.35	0.25	0.57	6.93	3.50	4
Total	61	2.37	1.54	0.20	1.98	2.76	0.50	7.50

Table 86. Test of homogeneity of variances for sunbathing by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.52	3	57	0.22

Table 87. ANOVA for sunbathing by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	7.19	3	2.40	1.01	0.40
Within groups	135.09	57	2.37		
Total	142.27	60			

3.7 SPSS Output for Analysis of Fishing (Shore/pier)

3.7.1 Number of hours fishing (shore/pier) by location

Table 88. Descriptive statistics for fishing by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	6	2.65	1.71	0.70	0.85	4.45	0.40	5.50
5	3	1.83	1.89	1.09	-2.87	6.54	0.50	4
6	27	2.91	1.03	0.20	2.50	3.31	1	5
12	4	2.38	0.75	0.38	1.18	3.57	1.50	3
13	28	2.68	0.95	0.18	2.31	3.05	0.50	5
Total	68	2.71	1.09	0.13	2.45	2.98	0.40	5.50

Table 89. Test of homogeneity of variances for fishing by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.49	4	63	0.22

Table 90. ANOVA for fishing by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	3.85	4	0.96	0.80	0.53
Within groups	75.68	63	1.20		
Total	79.53	67			

3.7.2 Number of hours fishing (shore/pier) by age group

Table 91. Descriptive statistics for fishing by age group (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
11-20	14	2.93	1.05	0.28	2.23	3.54	1.50	5.50
21-30	11	2.49	1.11	0.33	1.75	3.24	0.40	4
31-40	22	3.02	1.16	0.25	2.51	3.54	0.50	5
41-50	12	1.92	0.82	0.24	1.40	2.44	0.50	3
51-60	5	2.90	0.74	0.33	1.98	3.82	2	4
61-70	2	2.75	0.35	0.25	-0.43	5.93	2.50	3
>70	2	3.25	1.77	1.25	-12.63	19.13	2	4.50
Total	68	2.71	1.09	0.13	2.49	2.98	0.40	5.50

Table 92. Test of homogeneity of variances for fishing by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.68	6	61	0.67

Table 93. ANOVA for fishing by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	11.66	6	1.94	1.75	0.13
Within groups	67.87	61	1.11		
Total	79.53	67			

3.7.3 Number of hours fishing (shore/pier) by gender

Table 94. Descriptive statistics for fishing by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	57	2.65	1.13	0.15	2.35	2.95	0.40	5.50
Female	12	2.96	0.84	0.24	2.43	3.50	2	5
Total	69	2.70	1.08	0.13	2.44	2.96	0.40	5.50

Table 95. Test of homogeneity of variances for fishing by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
3.25	1	67	0.08

Table 96. ANOVA for fishing by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.96	1	0.96	0.81	0.37
Within groups	79.08	67	1.18		
Total	80.03	68			

3.7.4 Number of hours fishing (shore/pier) by ethnic group

Table 97. Descriptive statistics for fishing by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	44	2.50	1.01	0.15	2.19	2.81	0.40	5
Asian	17	2.79	1.03	0.25	2.26	3.33	0.50	4
Hispanic	3	4.17	1.89	1.09	-0.54	8.87	2	5.50
Other	4	3.50	0.58	0.29	2.58	4.42	3	4
Total	68	2.71	1.09	0.13	2.44	2.97	0.40	5.50

Table 98. Test of homogeneity of variances for fishing by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.56	3	64	0.21

Table 99. ANOVA for fishing by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	10.96	3	3.65	3.39	0.02
Within groups	69.04	64	1.08		
Total	79.99	67			

Table 100. Tukey's multiple comparisons for fishing by ethnicity (Shoreline Use Survey)

(I)Ethnicity	(J) Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Caucasian	Asian	-.296	.2966	.751	-1.078	.486
	Hispanic	-1.669	.6197	**.044**	-3.303	-.034
	Other	-1.002	.5424	.261	-2.433	.429
Asian	Caucasian	.296	.2966	.751	-.486	1.078
	Hispanic	-1.373	.6504	.161	-3.088	.343
	Other	-.706	.5772	.615	-2.228	.817
Hispanic	Caucasian	1.669	.6197	**.044**	.034	3.303
	Asian	1.373	.6504	.161	-.343	3.088
	Other	.667	.7932	.835	-1.426	2.759
Other	Caucasian	1.002	.5424	.261	-.429	2.433
	Asian	.706	.5772	.615	-.817	2.228
	Hispanic	-.667	.7932	.835	-2.759	1.426

3.8 SPSS Output for Analysis of Wading (Legs Only)

3.8.1 Number of hours wading (legs only) by location

Table 101. Descriptive statistics for wading by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	7	0.69	0.30	0.11	0.42	0.96	0.33	1
4	6	1.83	1.37	0.56	0.40	3.27	0.50	4
5	5	1.20	0.76	0.34	0.26	2.14	0.50	2.50
6	11	0.98	1.03	0.31	0.29	1.67	0.25	3
10	4	1.15	0.77	0.38	-0.07	2.37	0.50	2
12	9	0.97	0.32	0.11	0.73	1.22	0.25	1.50
13	8	1.50	1.28	0.45	0.43	2.57	0.50	3.50
Total	50	1.16	0.93	0.13	0.89	1.42	0.25	4

Table 102. Test of homogeneity of variances for wading by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
4.27	6	43	0.00

Table 103. ANOVA for wading by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	5.88	6	0.98	1.15	0.35
Within groups	36.75	43	0.86		
Total	42.64	49			

Table 104. Kruskall-Wallace non-parametric tests for wading by location (Shoreline Use Survey)

Site	N	Mean Rank
2	7	18.93
4	6	34.42
5	5	28.80
6	11	18.59
10	4	27.88
12	9	26.78
13	8	29.38
Total	50	
Kruskall-Wallace Test		
Chi-square = 7.58	Degrees of freedom = 6	Significance = 0.27

3.8.2 Number of hours wading (legs only) by age group

Table 105. Descriptive statistics for wading by age group (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
≤ 10	11	1.40	1.41	0.42	0.46	2.35	0.25	3.50
11-20	13	1.19	1.05	0.29	0.56	1.83	0.50	4
21-30	7	0.79	0.27	0.10	0.54	1.03	0.50	1
31-40	11	1.07	0.50	0.15	0.74	1.40	0.33	2
41-50	6	1.33	0.88	0.36	0.41	2.25	0.50	3
Total	48	1.17	0.94	0.14	0.90	1.44	0.25	4

Table 106. Test of homogeneity of variances for wading by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
6.10	4	43	0.00

Table 107. ANOVA for wading by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	1.90	4	0.48	0.51	0.73
Within groups	39.79	43	0.93		
Total	41.69	47			

Table 108. Kruskall-Wallace non-parametric tests for wading by age group (Shoreline Use Survey)

Site	N	Mean Rank
≤ 10	11	22.05
11-20	13	24.77
21-30	7	21.29
31-40	11	26.77
41-50	6	29.83
51-60	1	38.00
Total	49	
Kruskall-Wallace Test		
Chi-square = 2.80	Degrees of freedom = 5	Significance = 0.73

3.8.3 Number of hours wading (legs only) by gender

Table 109. Descriptive statistics for wading by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	16	1.71	1.28	0.32	1.03	2.39	0.33	4
Female	33	0.92	0.58	0.10	0.71	1.12	0.25	3
Total	49	1.18	0.93	0.13	0.91	1.44	0.25	4

Table 110. Test of homogeneity of variances for wading by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
28.53	1	47	0.00

Table 111. ANOVA for wading by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	6.75	1	6.75	9.01	0.00
Within groups	35.19	47	0.75		
Total	41.94	48			

Table 112. Kruskall-Wallace non-parametric tests for wading by gender (Shoreline Use Survey)

Site	N	Mean Rank
Male	16	30.41
Female	33	22.38
Total	49	
Kruskall-Wallace Test		
Chi-square = 3.62	Degrees of freedom = 1	Significance = 0.06

3.8.4 Number of hours wading (legs only) by ethnic group

Table 113. Descriptive statistics for wading by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	40	1.21	0.99	0.16	0.89	1.53	0.25	4
African American	2	1.00	0.00	0.00	1.00	1.00	1.00	1
Asian	8	0.94	0.71	0.25	0.34	1.53	0.33	2
Total	50	1.16	0.93	0.13	0.89	1.42	0.25	4

Table 114. Test of homogeneity of variances for wading by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.56	2	47	0.22

Table 115. ANOVA for wading by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.55	2	0.28	0.31	0.74
Within groups	42.08	47	0.90		
Total	42.64	49			

3.9 SPSS Output for Analysis of Running

3.9.1 Number of hours running by location

Table 116. Descriptive statistics for running by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	12	1.15	0.70	0.20	0.70	1.59	0.50	2.50
4	6	0.92	0.56	0.23	0.33	1.51	0.25	1.50
5	2	1.25	0.35	0.25	-1.93	4.43	1	1.50
6	12	0.69	0.33	0.10	0.48	0.91	0.17	1.25
10	6	0.98	0.32	0.13	0.64	1.32	0.50	1.50
13	5	0.85	0.14	0.06	0.68	1.02	0.75	1
Total	43	0.94	0.50	0.08	0.78	1.09	0.17	2.50

Table 117. Test of homogeneity of variances for running by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.97	5	37	0.11

Table 118. ANOVA for running by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	1.48	5	0.30	1.24	0.31
Within groups	8.83	37	0.24		
Total	10.31	42			

3.9.2 Number of hours running by age group

Table 119. Descriptive statistics for running by age group (Shoreline Use Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
≤ 10	8	0.44	0.28	0.10	0.21	0.67	0.17	0.83
11-20	5	1.15	0.34	0.15	0.73	1.57	0.75	1.50
21-30	13	0.85	0.33	0.09	0.65	1.05	0.25	1.50
31-40	12	1.06	0.55	0.16	0.71	1.41	0.50	2.50
41-50	5	1.30	0.69	0.31	0.44	2.16	0.75	2.50
Total	43	0.92	0.51	0.08	0.76	1.07	0.17	2.50

Table 120. Test of homogeneity of variances for running by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.95	4	38	0.44

Table 121. ANOVA for running by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	3.15	4	0.79	3.94	0.01
Within groups	7.61	38	0.20		
Total	10.76	42			

Table 122. Tukey's multiple comparisons for running by age group (Shoreline Use Survey)

(I) AGE	(J) AGE	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
<=10	11-20	-.71	.255	.059	-1.44	.02
	21-30	-.41	.201	.271	-.98	.17
	31-40	-.62	.204	**.032**	-1.21	-.04
	41-50	-.86	.255	**.014**	-1.59	-.13
11-20	<=10	.71	.255	.059	-.02	1.44
	21-30	.30	.235	.699	-.37	.98
	31-40	.09	.238	.995	-.59	.77
	41-50	-.15	.283	.984	-.96	.66
21-30	<=10	.41	.201	.271	-.17	.98
	11-20	-.30	.235	.699	-.98	.37
	31-40	-.21	.179	.758	-.73	.30
	41-50	-.45	.235	.321	-1.13	.22
31-40	<=10	.62	.204	**.032**	.04	1.21
	11-20	-.09	.238	.995	-.77	.59
	21-30	.21	.179	.758	-.30	.73
	41-50	-.24	.238	.848	-.92	.44
41-50	<=10	.86	.255	**.014**	.13	1.59
	11-20	.15	.283	.984	-.66	.96
	21-30	.45	.235	.321	-.22	1.13
	31-40	.24	.238	.848	-.44	.92

3.9.3 Number of hours running by gender

Table 123. Descriptive statistics for running by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	19	0.83	0.42	0.10	0.63	1.04	0.17	1.50
Female	24	1.00	0.56	0.11	0.76	1.23	0.17	2.50
Total	43	0.92	0.51	0.08	0.77	1.08	0.17	2.50

Table 124. Test of homogeneity of variances for running by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.03	1	41	0.87

Table 125. ANOVA for running by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.29	1	0.29	1.14	0.29
Within groups	10.45	41	0.26		
Total	10.74	42			

3.9.4 Number of hours running by ethnic group

Table 126. Descriptive statistics for running by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	40	0.91	0.51	0.08	0.75	1.08	0.17	2.50
Other	3	1.00	0.50	0.29	-0.24	2.24	0.50	1.50
Total	43	0.92	0.51	0.08	0.76	1.07	0.17	2.50

Table 127. Test of homogeneity of variances for running by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.01	1	41	0.94

Table 128. ANOVA for running by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.02	1	0.02	0.08	0.77
Within groups	10.74	41	0.26		
Total	10.76	42			

3.10 SPSS Output for Analysis of Scuba Diving

3.10.1 Number of hours scuba diving by location

Table 129. Descriptive statistics for scuba diving by location (Shoreline Use Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
2	2	0.67	0.00	0.00	0.67	0.67	0.70	0.70
6	33	1.86	1.43	0.25	1.35	2.37	0.50	8
13	12	1.79	0.88	0.26	1.23	2.35	0.50	3.50
Total	47	1.79	1.29	0.19	1.41	2.17	.050	8

Table 130. Test of homogeneity of variances for scuba diving by location (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.90	2	44	0.41

Table 131. ANOVA for scuba diving by location (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	2.68	2	1.34	0.80	0.46
Within groups	73.89	44	1.68		
Total	76.58	46			

3.10.2 Number of hours scuba diving by age group

Table 132. Descriptive statistics for scuba diving by age group (Shoreline Use Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
21-30	15	1.54	0.62	0.16	1.20	1.89	0.50	2
31-40	18	1.86	0.97	0.23	1.38	2.34	0.70	4
41-50	9	1.34	1.07	0.36	0.52	2.17	0.80	4
51-60	3	2.33	1.04	0.60	-0.25	4.92	1.50	3.50
Total	45	1.68	0.90	0.13	1.41	1.95	0.50	4

Table 133. Test of homogeneity of variances for scuba diving by age group (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.59	3	41	0.63

Table 134. ANOVA for scuba diving by age group (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	3.15	3	1.05	1.32	0.28
Within groups	32.67	41	0.80		
Total	35.82	44			

3.10.3 Number of hours scuba diving by gender

Table 135. Descriptive statistics for scuba diving by gender (Shoreline Use Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	35	1.80	1.45	0.25	1.30	2.30	0.50	8
Female	11	1.75	0.68	0.21	1.29	2.27	0.80	3
Total	46	1.79	1.30	0.19	1.40	2.17	0.50	8

Table 136. Test of homogeneity of variances for scuba diving by gender (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.62	1	44	0.21

Table 137. ANOVA for scuba diving by gender (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.02	1	0.02	0.01	0.92
Within groups	76.51	44	1.74		
Total	76.53	45			

3.10.4 Number of hours scuba diving by ethnic group

Table 138. Descriptive statistics for scuba diving by ethnicity (Shoreline Use Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	39	1.77	1.36	0.22	1.33	2.21	0.50	8
Asian	4	2.63	0.63	0.31	1.62	3.63	2	3.50
Other	4	1.19	0.55	0.28	0.31	2.07	0.80	2
Total	47	1.79	1.29	0.19	1.41	2.17	0.50	8

Table 139. Test of homogeneity of variances for scuba diving by ethnicity (Shoreline Use Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
0.70	2	44	0.50

Table 140. ANOVA for scuba diving by ethnicity (Shoreline Use Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	4.26	2	2.13	1.30	0.28
Within groups	72.31	44	1.64		
Total	76.58	46			

4.0 ANALYSIS OF THE SEAFOOD CONSUMPTION SURVEY

Analysis of the data for the number of hours and number of days per month fishing from the Seafood Consumption Survey followed the methods as described in Section 1.0. The number of hours and number of days fishing per month were assessed by location, age, gender and ethnicity. Statistical analysis revealed that there were no significant differences ($p<0.05$) between any of the groups examined. The SPSS output is presented in Sections 4.1 and 4.2. No additional analyses were performed on the Seafood Consumption Survey data.

4.1 SPSS Output for the Number of Hours Fishing

4.1.1 Number of hours fishing by location

Table 141. Descriptive statistics for number of hours fishing by location (Seafood Consumption Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
1	37	3.24	1.66	0.27	2.69	3.80	0.50	8
7	72	3.91	2.34	0.28	3.36	4.46	1	12
13	5	3.80	0.57	0.25	3.09	4.51	3	4.50
14	18	3.33	2.50	0.59	2.09	4.58	0.50	9
Total	132	3.64	2.15	0.19	3.27	4.01	0.50	12

Table 142. Test of homogeneity of variances for number of hours fishing by location (Seafood Consumption Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
2.12	3	128	0.10

Table 143. ANOVA for number of hours fishing by location (Seafood Consumption Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	12.88	3	4.29	0.92	0.43
Within groups	594.77	128	4.65		
Total	607.66	131			

4.1.2 Number of hours fishing by age group

Table 144. Descriptive statistics for number of hours fishing by age group (Seafood Consumption Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
10-20	21	4.17	2.50	0.54	3.03	5.30	1	12
21-30	27	3.04	2.21	0.43	2.16	3.91	0.50	8
31-40	35	3.69	1.69	0.28	3.11	4.26	1	9
41-50	26	4.21	2.53	0.50	3.19	5.23	2	12
51-60	9	2.67	1.15	0.38	1.79	3.55	1	4.50
61-70	10	3.95	2.15	0.68	2.41	5.50	2	9
>70	3	1.17	0.29	0.17	0.45	1.88	1	1.50
Total	131	3.63	2.17	0.19	3.25	4.00	0.50	12

Table 145. Test of homogeneity of variances for number of hours fishing by age group (Seafood Consumption Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.46	6	124	0.20

Table 146. ANOVA for number of hours fishing by age group (Seafood Consumption Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	52.02	6	8.67	1.92	0.08
Within groups	561.15	124	4.53		
Total	613.17	130			

4.1.3 Number of hours fishing by gender

Table 147. Descriptive statistics for number of hours fishing by gender (Seafood Consumption Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	116	3.61	2.24	0.21	3.20	4.02	0.50	12
Female	16	3.78	1.53	0.38	2.97	4.60	2	8
Total	132	3.63	2.16	0.19	3.26	4.00	0.50	12

Table 148. Test of homogeneity of variances for number of hours fishing by gender (Seafood Consumption Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
2.50	1	130	0.12

Table 149. ANOVA for number of hours fishing by gender (Seafood Consumption Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	0.40	1	0.40	0.09	0.77
Within groups	611.53	130	4.70		
Total	611.93	131			

4.1.4 Number of hours fishing by ethnic group

Table 150. Descriptive statistics for number of hours fishing by ethnicity (Seafood Consumption Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	71	3.38	1.91	0.23	2.93	3.83	0.50	12
African American	7	3.86	2.54	0.96	1.50	6.21	1	9
Asian	36	3.96	2.49	0.41	3.12	4.80	0.50	12
Hispanic	9	4.11	2.33	0.78	2.32	5.90	1	8
Mixed	5	4.60	2.82	1.26	1.10	8.10	2	9
Native American	4	2.75	0.96	0.48	1.22	4.27	1.5	3.50
Total	132	3.64	2.15	0.19	3.27	4.01	0.50	12

Table 151. Test of homogeneity of variances for number of hours fishing by ethnicity (Seafood Consumption Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.17	5	126	0.33

Table 152. ANOVA for number of hours fishing by ethnicity (Seafood Consumption Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	18.54	5	3.71	0.79	0.56
Within groups	589.12	126	4.68		
Total	607.66	131			

4.2 SPSS Output for the Number of Days Fishing Per Month

4.2.1 Number of days fishing per month by location

Table 153. Descriptive statistics for number of days/month fishing by location (Seafood Consumption Survey)

Site	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
1	36	4.74	4.96	0.83	3.06	6.52	0.08	24
7	72	6.86	6.53	0.77	5.33	8.40	0.08	30
13	5	4.82	4.36	1.95	-0.60	10.23	0.08	12
14	17	6.24	8.85	2.15	1.69	10.79	0.08	28
Total	130	6.11	6.43	0.56	5.00	7.23	0.08	30

Table 154. Test of homogeneity of variances for number of days/month fishing by location (Seafood Consumption Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
2.61	3	126	0.054

Table 155. ANOVA for number of days/month fishing by location (Seafood Consumption Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	117.54	3	39.18	0.95	0.42
Within groups	5223.70	126	41.46		
Total	5341.24	129			

4.2.2 Number of days fishing per month by age group

Table 156. Descriptive statistics for number of days/month fishing by age group (Seafood Consumption Survey)

Age	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
10-20	21	6.61	6.30	1.37	3.74	9.47	0.08	28
21-30	25	6.45	8.27	1.65	3.03	9.86	0.08	28
31-40	34	5.17	4.44	0.76	3.62	6.72	0.08	15
41-50	26	5.85	6.43	1.26	3.25	8.44	0.08	22
51-60	9	4.57	4.07	1.36	1.44	7.71	0.08	12
61-70	10	7.19	8.84	2.80	0.87	13.51	0.08	30
>70	3	10.03	9.12	5.27	-12.63	32.68	0.08	18
Total	128	6.02	6.42	0.57	4.90	7.15	0.08	30

Table 157. Test of homogeneity of variances for number of days/month fishing by age group (Seafood Consumption Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.62	6	121	0.15

Table 158. ANOVA for number of days/month fishing by age group (Seafood Consumption Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	117.91	6	19.65	0.46	0.83
Within groups	5120.97	121	42.32		
Total	5238.88	127			

4.2.3 Number of days fishing per month by gender

Table 159. Descriptive statistics for number of days/month fishing by gender (Seafood Consumption Survey)

Gender	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Male	113	6.17	6.14	0.58	5.03	7.32	0.08	28
Female	16	5.90	8.59	2.15	1.32	10.48	0.08	30
Total	129	6.14	6.45	0.57	5.01	7.26	0.08	30

Table 160. Test of homogeneity of variances for number of days/month fishing by gender (Seafood Consumption Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.18	1	127	0.28

Table 161. ANOVA for number of days/month fishing by gender (Seafood Consumption Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	1.03	1	1.03	0.03	0.88
Within groups	5330.43	127	41.97		
Total	5331.46	128			

4.2.4 Number of days fishing per month by ethnic group

Table 162. Descriptive statistics for number of days/month fishing by ethnicity (Seafood Consumption Survey)

Ethnicity	N	Mean	Standard Deviation	Standard Error	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Minimum	Maximum
Caucasian	70	5.95	6.92	0.83	4.30	7.60	0.08	28
African American	7	4.14	5.55	2.10	-0.99	9.27	0.08	16
Asian	35	6.80	6.02	1.02	4.73	8.86	0.08	30
Hispanic	8	7.00	4.87	1.72	2.93	11.07	1	14
Mixed	5	6.58	9.17	4.10	-4.80	17.96	0.08	22
Native American	4	5.63	2.75	1.38	1.25	10.00	3	8
Total	129	6.16	6.44	0.57	5.04	7.28	0.08	30

Table 163. Test of homogeneity of variances for number of days/month fishing by ethnicity (Seafood Consumption Survey)

Levene Statistic	Degrees of freedom 1	Degrees of freedom 2	Significance
1.27	5	123	0.28

Table 164. ANOVA for number of days/month fishing by ethnicity (Seafood Consumption Survey)

Comparison	Sum of Squares	Degrees of freedom	Mean Square	F-statistic	Significance
Between groups	53.36	5	10.67	0.25	0.94
Within groups	5251.22	123	42.69		
Total	5304.58	128			